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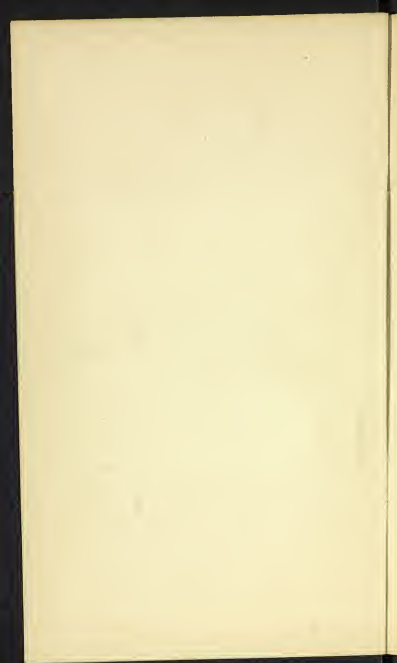


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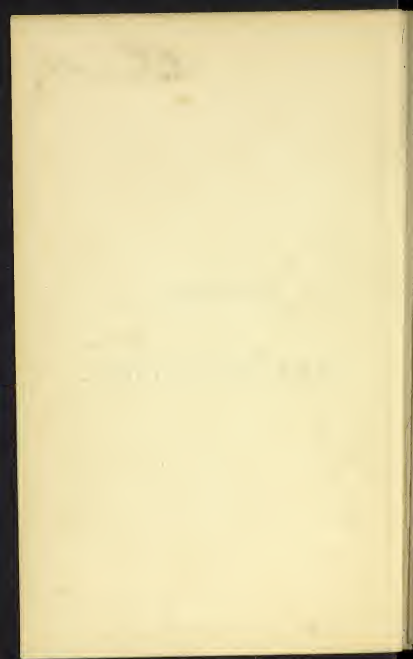


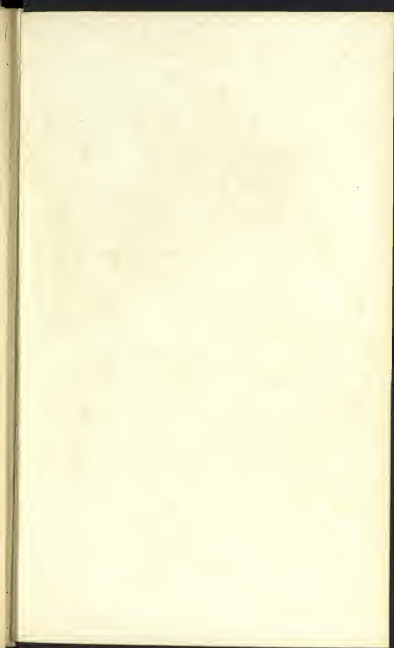
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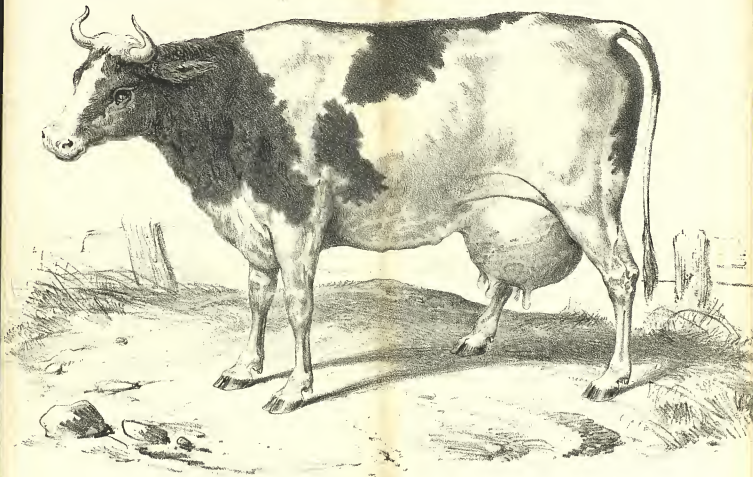
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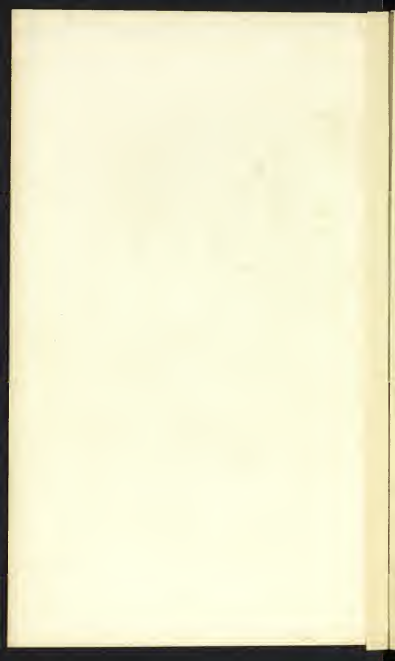
GOOD MILK COW.







A GOOD MILK COW.
[Dutch Breed]





HOW TO CHOOSE
A GOOD MILK COW;

OR,

A DESCRIPTION OF ALL THE MARKS BY WHICH THE MILKING
QUALITIES OF COWS MAY BE ASCERTAINED.

By J. H. MAGNE,

PROFESSOR OF THE VETERINARY SCHOOL, ALFORT.

WITH A SUPPLEMENT,

ON THE DAIRY CATTLE OF BRITAIN; THEIR QUALITIES, MANAGEMENT, AND
PRODUCTIVE RESULTS; WITH HINTS FOR SELECTING.

By JOHN HAXTON.

ILLUSTRATED WITH ENGRAVINGS.

BLACKIE AND SON:

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PREFACE.

MILK is probably the only article of farm produce of which the British farmer has now a monopoly in the home market; for, however largely foreigners may supply us with the manufactured products of the dairy, in the shape of cheese and salted butter, their distance precludes all attempts at competition in milk itself. A new and important outlet has also recently been opened up for the consumption of milk, in the preparation of wool for being manufactured into cloth, and for certain processes connected with this, the action of milk has been found to be superior to that of the purely oleaginous substances formerly employed. The great probability is, that new uses may be discovered in the arts for the produce of the Cow, and thus a still wider field be afforded for dairy farming. But even although no such demand should ever be created, still with a large, fully employed, and rapidly-increasing population, which would willingly consume double the amount of milk that it does at present, there is not likely soon to occur any lack of profitable employment to the dairy farmer. If, however, he should rest contented with an inferior stock of Milk Cows, and a low scale of feeding (as are too commonly to be met with in many parts of the country), his profits will remain as they are; while, at the same time, the public will be inadequately served, with a high-priced and frequently an adulterated article. On the other hand, were greater attention paid to the breeding and selecting of Dairy Cows, according to those rules which an attempt has been made to systematise in the following Treatise, then the dairyman's profits would be increased, in consequence of the more highly-developed milking properties of every animal in his pack; while, at the same time, the public would be more abundantly and cheaply supplied: the

apparent discrepancy of lower prices and higher profits, being explained by the fact of a more profitable consumption of the food from which the increase of produce is obtained.

The Work now presented to the agricultural public, is designed to supply a species of information regarding the Breeding and Selection of Cows for dairy purposes, which is not generally known. No rules, whether scientific or practical, can fully compensate for the absence of experimental knowledge, or such as is derived from long-continued personal experience and intelligent observation, but they are of use in shortening the process of investigation, by starting the experimenter in the right direction.

The first part of this book consists of a translation from the French work of M. Magne, and contains much interesting information regarding certain external marks in Cows, which are held by the writer to indicate corresponding milking properties, according as they are largely developed or otherwise, and which have been entirely overlooked by British authors on dairy farming. M. Magne's remarks are founded on the researches of Monsieur Guenon, the ingenious advocate of the "escutcheon" theory, and are designed to explain, modify, and render more practical the statements of the latter, and to disencumber them of certain fanciful hypotheses and wire-drawn refinements and calculations, which are otherwise calculated to engender scepticism as regards the entire system propounded.

The latter portion of the Work contains a condensed view of the different breeds of Dairy Cows in Great Britain and Ireland, with remarks on their origin, distinctive characteristics, and practical uses. The union of the two Treatises in one book is designed to place the subject of dairy farming in a somewhat new and interesting light before the public, and in such a compass as neither to tax the reader's pocket, nor to demand any laborious exertions in its perusal.

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fig. II.



A GOOD MILK COW.
(Friesian breed).

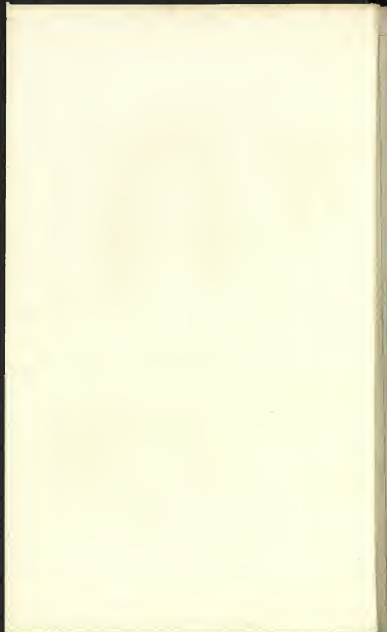


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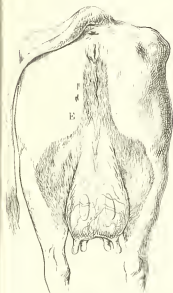


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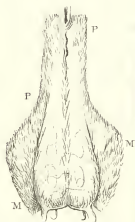


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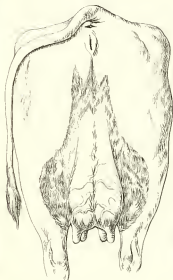


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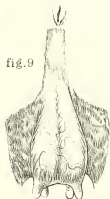


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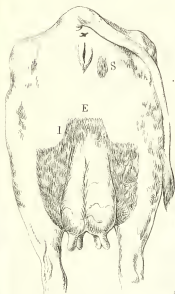


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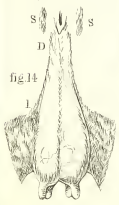


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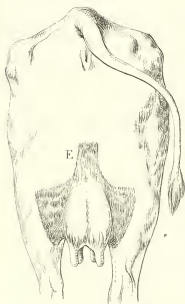


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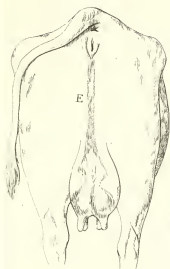


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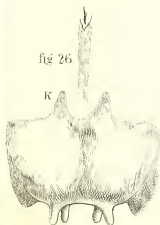
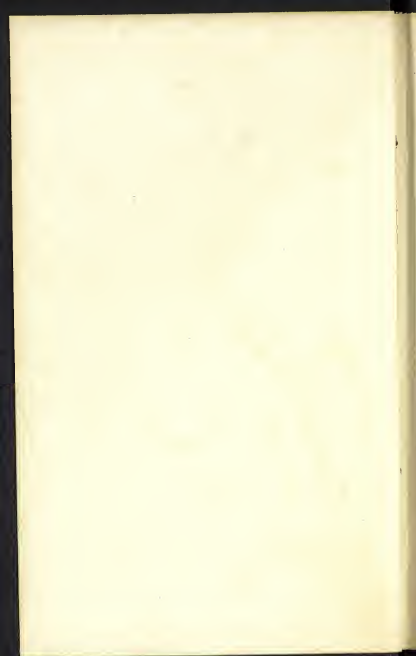


fig 27





INTRODUCTION.

THE necessity of a good selection of domestic animals is, perhaps, nowhere more felt than in the case of milk cows. A good cow, which consumes in proper food, what is equal to from thirty to thirty-three lbs. of hay, is able to give from twenty-six to thirty-two English pints of milk, during fifteen or sixteen months, and even from thirty-five to forty-four pints after calving; whereas, a bad cow, with the same quantity of food, and the same treatment, scarcely gives from ten to fourteen pints, and loses it shortly after weaning her calf.

This subject, the full importance of which has been understood since modern agriculture showed the necessity of paying a strict regard to accuracy in all rural operations, never attracted so much attention as it now does, since M. Guenon affirmed and maintained that it is easy to determine beforehand, and to a perfect nicety, what the

properties of cows are, with reference both to the quantity and the quality of their milk, and the time during which they can continue to give it.

Any one who knows how difficult it is to choose a cow, can understand the effect produced by a book, in which the author professes to establish "a natural method, by means of which the different sorts of milk cows may easily be ascertained and classed; 1st, According to the quantity of milk which they can give daily; 2d, The longer or shorter time during which they can give it; and, 3d, The quality of the milk itself."

Without considering here whether the *scutcheon* (French *écusson*), a thin layer of hair growing upwards and covering the udder and perinæum of most cows, can possibly give the perfect information claimed for it in the above quotation, we think that even since the work of M. Guenon, a treatise on the selection of a milk cow may be useful, by giving a more complete description of scutcheons than has yet appeared. We know, from our own experience, and that of several persons who have applied to us for explanation, how difficult it is to form a proper estimate of scutcheons from the descriptions given

by authors, who have made them the basis of their system.

We thought it might also be useful to furnish a new mode of ascertaining the different marks which have at all times been acknowledged to belong to good milkers. The scutcheon is not of itself sufficient to enable us to select with certainty. The numerous and serious mistakes committed by those who wish to use it as their only guide (we do not except the masters of the art), sufficiently demonstrate the necessity of keeping all the known marks in view when selecting a cow.

There is another point of view, in which it seemed to us that a simple treatise on the selection of milk cows might be useful to farmers.

On the system of scutcheons five classes of cows were first established; each class was divided into three sections, and each section into three orders. Experience showed that the characters of the classes based on the scutcheon are not distinctly marked, that they often run into each other, and form intermediate classes. In consequence of this, at least a dozen of new classes have since been established. Hence, the system of scutcheons at pre-

sent comprehends twenty classes, and 480 orders, and each of these 480 orders is understood to give a fixed quantity of milk, and continue to give it during a definite period! When we add, that *bastard* milkers—meaning by the term those which do not give milk long—are not included in this enumeration, and that the 480 orders may have bastards of various degrees, it will be perceived that this system, were it unobjectionable in principle, must be extremely difficult, or rather impossible of application, by persons who want time to study, or memory to remember it.

We were, long ago, struck by the excessively complicated nature of the system, and repeatedly advised M. Guenon to simplify it; he, on the contrary, has thought it right to increase the number of his classes.

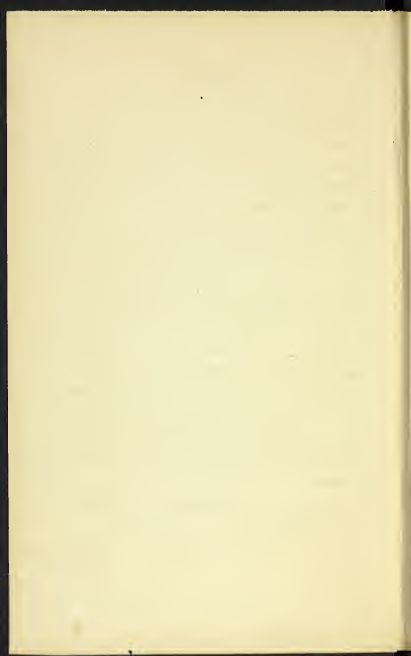
And yet, how many farmers have derived no advantage from M. Guenon's discovery, because they have found the system too complicated! How many believe its practical application to be impossible, by those who are unable to enter deeply into the study of classes and orders!

Our object, therefore, in the following pages, is

to give a good description of what are called tufts or scutcheons; to form a just estimate of all the known marks of good milk cows; and furnish rules, of easy application, for those who, from want of time or memory, are unable to avail themselves of a complicated classification.

After this statement, it seems superfluous to add, that this treatise will not be able to satisfy those who think they are able, when choosing a cow, to ascertain, to a perfect nicety, whether she will give seventeen pints, or eighteen pints; and whether she will continue to give it seven and a half months, or seven months only.* Not only do we not give such precise indications, but we think it impossible to give them. All we propose, then, is simply to explain the known marks, by means of which we may be able to ascertain, as exactly as possible, whether a cow is very good, good, middling, or bad.

* See *Traité des Vaches Laitières* par François Guénon. Bordeaux. 1839.



HOW TO CHOOSE A GOOD MILK COW.

MARKS FOR DETERMINING THE MILKING QUALITIES OF COWS.

It is not possible, by means of any particular mark, taken singly, to determine the milking qualities of cows. In choosing a milker, it is necessary to pay attention to all the facts and circumstances which go to determine the constitution of the cow—her temperament, and the relative power of her different organs. For, while the function of the udder is regulated by the activity of the milky glands (*mamelles*) which perform it, it depends also on the general state of the body, and specially on the digestive organs, the respiratory apparatus, the nervous system, &c.

With reference to the production of milk, we

will examine the general marks in succession, under the following heads:—Breed and descent; digestive and respiratory organs; shape, expression, constitution, temperament; the circumstances in which the cows have been placed; the number of calves they have had; and the diseases by which they have been affected. We will afterwards consider the local marks furnished by the udder; the scutcheons; the veins of the udder; the stomach, and the perinæum.

CHAPTER I.

GENERAL MARKS.

IN this chapter we will consider the marks furnished by the general state of the animal, and by the arrangements and functions which have only an indirect relation to the milky glands.

SECT. I.—BREED AND DESCENT.

1. *Breed*.—We find good milkers in all breeds, but they are rare in some, and very common in others. It could not be otherwise. Milking properties, depending on the conditions which determine the formation of breeds, are due partly to the climate, the soil, the air, and the plants of the countries where the breeds have originated; and must, therefore, vary in our different breeds of horned cattle with the hygienic conditions peculiar to each locality.

Milkers, and more especially animals intended for breeding, must always be selected among breeds

celebrated for abundance of milk. Not that we can hope to import into our departments, with a dry and warm climate, all the qualities of the excellent milking breeds possessed by countries in which the soil is fertile, the air moist, and the sky often cloudy; but, as the influences of climate, though very marked, take effect only in the long-run, the properties of the animals imported are maintained—though subject, doubtless, to gradual deterioration—during a period which varies with the precautions taken to preserve them; and for several generations the descendants of the individuals of a good imported breed give more milk than individuals belonging to a breed formed on the spot, when hygienic circumstances are not favourable to milking properties.

It is not to be forgotten, moreover, that under the influence of particular circumstances, which it is sometimes impossible to call into existence, animals manifest properties which we cannot produce directly. This explains why it is often more advantageous to import qualities possessed by foreign stock, than to try to develop them in native stock.

Here we deem it sufficient to observe, that good milking breeds are distinguished by a soft and supple skin, and by tissues rather relaxed than

rigid; are not hardy or fit to bear fatigue (sweating easily, and falling rapidly off when put to work); are difficult to keep, seldom fat, and have often little flesh on the buttocks.

Among the breeds well known in France for their milking properties, we mention the following:—

In the north, the Dutch breed, the Flemish breed, and (though in a less degree) the breed of Artois, all of which are imported into the environs of Paris.

In the north-west and west, the Normandy, Cotentin, and Brittany breeds, which are imported into the central, and even into the northern departments.

In the east, the Schwyz breed, at present widely diffused in the departments of Ain, Isère, and Rhone, and the breed of Bresse, which has been introduced alike into the south, and towards the centre, as far as the department of Nièvre.

In the Fribourg breed, so well known, especially in the east of France, we find some cows which give great quantities of milk; but as these cows eat much, their produce is seldom in proportion to the expense of their keep.

A small Scotch breed, that of Ayrshire, enjoys a high reputation in Britain for the abundance, if not for the quality of its milk. In the dairies of

London and Edinburgh, there are some of them which, notwithstanding their small size, yield daily forty-four pints of milk, and even more. The Durham breed also furnishes some cows which are far from being bad milkers, but, in general, have a great tendency to take on fat. They accordingly fatten, and become dry shortly after calving.

We find, moreover, in some other French breeds, varieties which, in the provinces where they are best known, are reputed good milkers. We may mention the cows of Auvergne, among which we have seen excellent milkers, and which, in the neighbourhood of Salers, form dairies remarkable for the quantity of their produce; the cows of Saint-Girons and Lourdes, known at Toulouse, and lauded by M. Martegonte as good milkers; the Femiline breed of Franche Comté; the Swiss breed of the mountains of the Doubs, considered good milkers, and imported more towards the north than towards the south; in fine, some breeds or varieties, found in the Vosges and in Alsace, and consisting either of old native breeds, or of breeds formed by crossing the above-mentioned breeds with each other, or with native breeds.

2. *Descent.*—As milking qualities are, in a great measure, dependent on structure and tempera-

ment, which are more or less hereditary, descent exercises a great influence.

In each breed, therefore, we should choose individuals belonging to the best stocks, and the offspring of parents remarkable for their milking qualities; for it is certain that good milk cows produce others which resemble them.

It should be our object, then, as far as possible, to obtain cows engendered by youngish bulls, whatever be the race to which they belong.

But it is, especially, when selecting stock for the purpose of breeding milk cows, that particular care should be taken to select individuals belonging to good families. A cow of a bad milking family, or even breed, may occasionally be an excellent milker, and more than this is not wanted when it is not meant to breed from her. The same cannot be said when breeding is intended, because there would be little chance of her transmitting the accidental or exceptional qualities possessed by her; whereas the qualities forming the fixed and constant characters of the stock would, almost to a certainty, be transmitted to descendants.

These remarks, with regard to breed and parentage, apply to the selection of the bull which, as experience demonstrates, acts like the cow in trans-

mitting the milking qualities which distinguish the breed and stock.

SECT. II.—DIGESTIVE AND RESPIRATORY ORGANS.

1. *Digestive Organs.*—These organs have a powerful influence on the exercise of all the functions, and particularly on the secretion of the milky glands. Where the digestive organs are defective, good milk cows are rarely met with.

A good state of the digestive organs is evinced by the following particulars:—

A belly of moderate size, with yielding sides, free from tightness: in aged beasts, the belly is often large, though the organs which it contains are in good condition;

A large mouth, thick and strong lips;

A good appetite, easy and quick digestion;

Glossy hair, supple skin, with a kind of unctuous feel.

Animals possessing these anatomical and physiological properties, eat well, drink much, and if they are properly fed, and not over-worked, make much blood, and yield large quantities of milk.

2. *Respiratory Organs.*—The respiratory organs complete the system of nutrition. The object of

the lungs is to bring the substance furnished by the food into contact with the air, and make it capable of nourishing; they digest air as the stomach digests food. Hence a good form and a healthy condition of the organs of the chest, are necessary to the production of much milk.

Their ability to fulfil their functions is evinced—when they are large, and lodged in a spacious cavity; in other words, when the chest is wide, deep, and prominent—when the ribs are long, and strongly arched throughout their whole length, and more especially at the upper extremity—when the withers are thick, and the brisket rounded behind the shoulder and elbow—when the spine is long, straight, horizontal, not saddle-backed, and the loins are wide—when the nostrils are large, dilated, and well opened—when the air is inhaled without any appearance of hurry, and exhaled from the chest in great puffs.

The movements of the flank are free, easy, and extensive, in beasts which breathe well.

These properties of the digestive and respiratory organs indicate that digestion and respiration, being well performed, furnish an abundant and rich blood; all the organs being in a state of activity favourable for the exercise of their functions. Animals com-

bining these properties in full vigour, are capable either of performing much work, or fattening rapidly, or giving much milk, according to the predominance either of the powers of motion, viz., the bones or muscles; or of the nutritive system, viz., the cellular and adipose tissues; or of the organs for providing milk, viz., the glands giving milky secretions, and the milk vessels.

SECT. III.—SHAPE, CONSTITUTION, FEATURES, TEMPERAMENT, COLOUR.

1. *Shape*.—Active mammary glands are seldom found united with the graceful, rounded forms which constitute what is vulgarly called *beauty* in quadrupeds. Most frequently good milkers have sharp points, and appear more or less loose and flabby. In regard to bony structure, they may be as well formed as cows remarkable for their readiness to fatten, or ability to work; but, being seldom in plump condition, they seem lean and raw-boned.

Hence, when a herd of cows have all been fed and kept in the same way, it would not be proper to fix upon the most beautiful as the best milkers. In so doing, we should be almost invariably mistaken. In the hind quarters, there is often some-

thing defective in regard to form: they are largely developed, but the flesh is not in proportion to the bone, and the bony protuberances are very visible; the haunches stick out, and the pelvis is wide; the legs, standing far apart, leave a considerable space as a receptacle for large milk vessels.

The blood flows in great abundance to the milky glands, and keeps them in activity at the expense of the other organs; the muscles are slender, and the buttocks and thighs small and narrow. This feature is very marked in the cow which we have given as a model of a good milker (Plate I. II.)

The cows we recommend as milkers are those whose chine, instead of being all of one piece, shows, towards its centre, a space occupied by a kind of shrivelling, the effect of the distance between the spinous processes of the vertebræ: the process of the last dorsal vertebræ is strongly bent forward.

In some cows, we have observed that this distinguishing mark is owing to the processes of the last dorsal vertebra being shorter than those of the preceding vertebra. In that case, the back has, at its middle, instead of a wrinkled or shrivelled part, a depression which is continued to the rump.

When this mark exists, the chine is often double in its posterior half; the ridge of the vertebræ is

large and wide, and seems forked, and a slight depression prevails along the medial line of the body, and is more especially visible near the rump.

This mark is much looked for in Flanders, where great importance is attached to it; and among the dairymen of Paris, as well as the south of France, where a common saying is, that a cow will be productive of milk, "especially when, towards the middle of the spine of the back, the processes stand apart so as to leave two spaces of two fingers' width." —(A. RODAT.)

If the chine is double, the vertebræ are thicker, the haunches more apart, and the loins and rump of greater width; in this case, the hind quarters are more largely developed, the pelvis more ample, and, consequently, the organs lodged in the cavity, and even the milk vessels, of larger dimensions.

The dairymen of Paris call these interruptions of the vertebral column *fontaines de dessus* (upper springs), in contradistinction to the *fontaines de dessous* (under springs), or those openings where the veins of the stomach sink into the flesh. They say that, in good cows, these upper and lower *fontaines* correspond with each other, and are equally large.

We may observe, that they never correspond,

since those above are upon the medial line of the body, and the others on the lateral parts of the belly; and that the name of springs (of milk) is not proper even for the lower one, although they are traversed by veins. The name thus given to the space left between the vertebræ, proves that it is a false analogy which has caused it to be considered as the sign of a good milker.

2. *Constitution.*—It is desirable that the special marks which indicate a great activity of the milky glands, and, consequently, a good milker, should be united with those which imply a good constitution.

These are large lungs, a broad and prominent chest, a somewhat slow respiration, an abdomen of moderate dimensions, a good appetite, and a great inclination to drink—an inclination stimulated by the abundant secretion of milk.

Such cows eat much, digest easily, and breathe well: they make *good* blood. This fluid gives activity to the nervous system, makes all the organs lively, and furnishes the glands with the materials of a copious secretion.

Cows possessing these properties last long, give much milk, and, when they become dry, soon fatten.

But it often happens that activity and vigour in the milky glands are united with close ribs, narrow,

feeble lungs, delicate digestive organs, a moderate appetite, and frequently an ardent thirst. In that case, the cows have a bad constitution, they can give much milk, but it is watery, and of bad quality, and they often die of disease of the lungs.

These cows seldom have many calves, though they show a great inclination for the bull; and they are difficult to fatten, even when they are in good health, and not giving milk.

3. *General appearance (Physionomie).*—In all breeds, the preference should be given to cows which in form are the farthest removed from that of bulls; to cows with small bones, fine and slender limbs, and a tail which is fine at its base; a small, but longish head, narrowing towards the horns; the horns themselves of a bright colour, tapering finely, and glistening; a supple and soft unctuous skin, covered, even on the forehead, with erect, glossy, soft hair, and provided, near the natural passages, with a short, fine, and silky down; a small neck, and shoulders (*encolure*) apparently long, because slender, especially near the head; small eyelids, well divided, but not much wrinkled; prominent eye, and a gentle, feminine look.

4. *Temperament.*—With these marks of a feminine description, cows should unite a sanguine-

lymphatic temperament, and especially a mild disposition. Good milkers allow themselves to be easily milked; often, while ruminating, they look with a pleased eye, easily recognised, at the person who milks them; they like to be caressed, and caress in return.

5. *Colour*.—We do not mention colour as a sign of milking qualities, for we find good milkers among black Dutch cows and red Flemish cows, as well as among white cows and the wheat-coloured cows of Bresse. Colour may be of great value, but it is chiefly as indicating the origin of the animal. The Flemings and Normans are very careful in preserving the colours of their horned cattle, but it is only because a red colour, serving to characterize animals of Flemish, and a brindled colour those of Norman breed, facilitate their sale.

SECT. IV.—HYGIENIC CONDITIONS TO WHICH COWS
HAVE BEEN SUBJECTED, THEIR AGE, AND THE
NUMBER OF CALVES THEY HAVE HAD.

Cows which have been calved in a mild and somewhat moist climate, and which have received due care and abundance of good moist food, are generally good milkers.

As happens in the case of all organs, the milky glands are developed by the exercise of their functions, and hence cows never give so much milk after their first and second, as after their subsequent calvings, especially when they have been made to calve young, before the development of their organs. It is after they have reared several calves, and been treated with regularity for a long time, that they give most milk.

Here, however, we may take the opportunity of advising those who wish to have excellent cows, not to select animals five or six years old exposed at fairs. Cows at that age are seldom sold, if free from fault.

We have observed, in all fairs and large markets, that there are very few good cows among those which have had three or four calves; the good are confined to the young or the aged.

We never find among the cows which are fattened in Flanders, for the express purpose of being sent to Paris, and known by the name of *Parisiennes*, animals which have had four calves. If they have been allowed to calve on the farm four times, they are excellent, and are kept as part of the dairy stock.

Cattle-feeders, especially, who do not wish to

have calves by their cows, and seldom find it their interest to keep them long, have a great advantage in buying those which are somewhat aged, provided they are in good condition, and have well-preserved teeth; there is a greater chance of their being good; with equal natural properties, they give more milk; they are bought cheaper, and when they cease to give milk, they bring nearly as much money from the butcher as the young. These advantages may often more than compensate for the shortness of the time during which old cows last.

Artificial nursing has numerous advantages, in several respects, but some persons think that it is not favourable to the secretion of the milky glands; they believe that cows which have suckled their calves, and whose glands have been long stimulated by the mouth of one or several sucklings, have always much more milk than those whose teats have only been in contact with the hands of a milk-woman.

It is conceivable that the gentle heat, the moisture of the lips, the agitation produced in the glands, and the powerful suction of the calves, may have much more effect in stimulating the milky glands than a hand, sometimes brutal, and almost always defective in intelligence. It does not seem, how-

ever, that this influence is so great as might be supposed, for there are many countries where they get on very well without allowing calves to suckle; indeed, artificial suckling is very much on the increase.

SECT. V.—DISEASES BY WHICH COWS HAVE BEEN
AFFECTED.

The influence of disease, which may be easily comprehended, is sometimes very great, and lasts during life. Affections which make great changes on the principal organs—the lungs, the stomach, the intestines, and the womb, and those which derange the functions of digestion and respiration—lessen the secretion of milk, and often render the liquid watery and bad.

Local diseases—those which cause acute pain—those which have their seat in the extremities, or in the mouth, and hamper the animal, either in walking among the grass or in taking food, diminish the secretion of milk, even when they do not affect the exercise of the principal functions of life.

But among local diseases, affections of the milky glands have the greatest influence in regard to milk. They attack sometimes a part, and sometimes the

whole of the udder. Thus cows, which, after their first calf, give milk equally by four teats, often after a disease of the udder give it only by three, two, and occasionally by no more than one.

It is not always easy to discover diseases of the milky glands when they have become chronic, and the organs have ceased to be painful. Most commonly, however, the diseased part is harder, or more flabby, or more bulky, or somewhat shrivelled; sometimes, too, it is painful on pressure. The teat corresponding to the diseased gland may be hardened or shrivelled; it is blind if the disease is of very long standing.

Cows which have the udder unequal, covered with lumps, and not of the same consistency and suppleness throughout, must be classed with those having diseased glands.

CHAPTER II.

LOCAL MARKS.

THESE are the marks furnished by the apparatus which secretes the milk, and by organs, veins, and the part of the skin depending on the same apparatus.

SECT. I.—UDDER, INCLUDING MILKY GLANDS AND
TEATS.

This organ is formed principally by the glands which secrete the milk, and are called *milky glands* (*mamelles*). These, four in number, two on each side, are sometimes designated by the name of quarters, each constituting nearly a fourth part of the udder.

The udder is composed, moreover, of skin, cellular tissue, fat, lymphatic ganglions, vessels, &c.

In almost all cows, the abundance of milk is proportioned to the size of the *mamelles*. The marks

indicating that these glands are constituted so as to produce much milk, are as follows:—

A very large development of the hind quarter, a wide and strong lumbar region, a long rump, haunches and hind legs wide apart, a large space for lodging the udder, milky glands well developed, and causing the udder to be of considerable size. (Plate II.)

We may here observe that it is necessary to pay attention to the nature of the udder; its size may depend on the quantity of cellular tissue, on the thickness of the skin, the abundance of fat, or the largeness of the gland. In good cows, the gland constitutes a very great part of it, and accordingly, after milking, it shrinks much, and becomes soft, flabby, and very wrinkled.

A greasy udder, improperly called *fleshy* (*charnu*) is of uniform texture (*homogène*) and firm; it resists pressure, and scarcely lessens on being squeezed; it is almost as bulky, and has as much consistency after milking as before.

Dealers, to prove that the udder is not *charnu*, draw back the skin which covers it; when it stretches much, they consider it a good sign, and call the attention of buyers to it. In fact, it is conceived that skin which has been habitually dis-

tended by great quantities of milk should be looser, and more capable of stretching, than that which has not undergone the same alternations of distension and relaxation.

Another object of the dealers, in thus stretching the udder, is to show that the cows are of a good kind, that they have a fine, soft, and supple skin. We must observe, however, that in all cows the skin of the udder has these properties; in different degrees, it is true, but still in degrees the difference of which few buyers are able to estimate. It is on the ribs that the skin ought to be examined, for that is the region where the differences presented by the different breeds of cattle are most perceptible.

Some persons attach importance to the form of the udder. We know some who look for an *attached* udder (*pis appliqué*); that is, an udder the glands of which extend forward, and seem glued to the belly.

But we have seen very good cows among those in which the udder is bottle-shaped, and hanging much, as well as among those in which it is placed high. The size and nature are the points which it is of importance to take into consideration.

The udder should be large and not greasy. If so, we may rest assured that the milky reservoirs

are spacious, and that the glands, consequently, furnish much milk.

The teats are of less importance than the glands. In the cow there are five or six, of which one or two behind are very small, and seldom give milk.

The four in front, the only ones necessary to be taken into account, are nearly equal. They become large or small, according to the time during which the cows are milked or sucked; and this explains why they are large in cows which give much milk, because such cows must be milked often, and for a long period. Indeed, it is only in this way that their size indicates the quantity of milk.

The two hinder teats usually furnish more milk than the two in front, because the two hinder glands, or, as they are called, *posterior quarters* (*quartiers posterieurs*), are almost always the largest in size.

The teats should be pliant, not blind, covered with a soft skin, and free from indurations, such as those produced by shrivelling. The warts, which are very frequently observed, are usually without sensation, and cause no inconvenience: it is better, however, when they are wanting, for they may make milking painful, and, by causing the cows to become restive, spill the milk, or lessen its quantity.

The name of *uddered* (*empissées*) is given to cows

which, having been left long unmilked, have the udder hard, swollen, and painful. Dealers, to give the appearance of good milkers, go the length of tying the teats. This practice might have troublesome consequences. It is sufficient to make it known. It is a sure sign that cows have been left long unmilked, when the udder is hard, and much distended, in proportion to its size; when the teats are stiff, wide apart, often painful, and allow milk to escape, though they are not touched.

The position of the teats is not of great importance, and yet it is desirable that they be apart from each other, as indicating that the milk vessels are spacious. This peculiarity is observed in the best cows. When the teats are crowded together, the glands are small, and the milk by no means abundant.

It is necessary, however, in determining the influence exercised by the position of the teats, to pay attention to the form of the udder. When it is long, like a bottle, the cow may be good, though the teats be close. The milk vessels are then developed from top to bottom, instead of from side to side, and between, before, and behind.

SECT. II.—VEINS.

Of all marks for ascertaining good cows, the best are afforded by the blood vessels; if the veins which surround the udder are large, winding, and varicose (dilated at intervals), they show that the glands receive much blood, and, consequently, that their functions are active, and that the milk is abundant.

1. *Veins of the Stomach, or Lacteal Veins.*—The veins on the lateral parts of the stomach (Plate I.) are most easily observed, and all authors have fixed on them as one of the best tests for ascertaining the activity of the glands.

These veins issue from the udder, in front, and at the outer angle, where they form, in very good cows, a considerable varicose swelling. They proceed toward the front part of the body, forming angles, more or less distinct, often divide towards their anterior extremity, and sink into the body by several openings.

We can make the size of the lacteal veins visible to the eye by touching them, by compressing them in their passage, or, in fine, by pressing them at the place where they penetrate into the flesh. In the last case, we sink the skin and the finger

into the opening through which the vein passes: the width of this opening represents the diameter of the vein, and then the thickness of the finger, which stops it, represents that of the column of blood whose place it occupies. It is superfluous to add that, when the veins are divided, it is necessary to examine all the openings by which they pass, in order to form a correct estimate.

2. *Milk Ways (Portes du Lait), Fountains.*—Such is the name given to the openings of which we have just been speaking. They are traversed by the lacteal veins at the moment when these disappear in the body.

The names, *portes du lait*, and *fontaines*, are improper, for the blood which flows in them is not going to the gland with the materials of milk, but returning from it. It is the part which has not been made available in the production of milk; in other words, the refuse of the secretion.

At the times when cows are not giving milk, the lacteal veins, little swollen, are not in accordance with the milking qualities. It is then necessary, for determining these qualities, to compress the vein at its anterior extremity, in order to stop the blood, and make the vein swell up. A good method of producing this result consists in thrusting the finger

into the opening by which the vein penetrates into the body. This process enables us, moreover, to determine the size of the vein, for when the blood diminishes, this opening contracts less rapidly than the vein.

3 *Veins of the Udder and of the Perinæum.*—The veins of the udder and the perinæum, to which hitherto sufficient importance has not been given, are able to furnish valuable indications. They should, in both cases, be highly developed, large and varicose; that is, exhibit inflations and nodosities.

The veins of the udder have no definite direction. They present themselves very irregularly, under the form of zigzag lines, knotted, and more or less oblique. They are never of very large size, except in cows which give great quantities of milk. (Plates I., II., III.)

The veins of the perinæum directed from above downwards, forming a winding line, interspersed with knots, resemble those of the udder, in not being visible either in heifers or in beasts of middling quality. We cannot ascertain their presence in any but very good cows.

In the cow (Plates I. and II.) on which we saw the vein of the perinæum for the first time, in the

vicinity of Lille, in 1847, in company with MM. Delplanque and Pommeret, this vein formed a very large knotted and winding line. The Dutch cow which had it (Plates I. and II.), though not of large size, gave seventy pints daily, and did not become dry while in calf. All the surface of the udder was varicose, interspersed with transverse veins.

Since that particular case drew our attention to this mark, we have had opportunities of observing it on a very great number of cows. M. Collot also gives this vein as one of the marks of excellent milkers.

The veins of the perinæum, in the best milkers, form a network beneath the skin, which it raises up in a greater or less degree. In some of the best cows, these veins mark their position by a large knotted line, but most frequently, in order to make them visible, it is necessary to use pressure across the skin at the base of the perinæum. The pressure causes them to swell, and makes them discernible both by sight and touch. It is even easy, by making the blood flow back towards the *vulva*, to produce very apparent undulations.

We should always pay attention to these movements of the blood, in order not to mistake the folds, sometimes exhibited by the skin of the peri-

næum, for veins. Error is especially to be feared in the case of fat cows, on account of the fatty inflations which appear in the perinæum. The veins buried in fat cannot be distinguished by the motions of the blood, which often are by no means apparent.

In some cows, the vein is found between two folds on each side of the perinæum; it is there much less prominent than the folds, and becomes perceptible only by the fluctuation of the blood.

At other times (this is when the perinæum is united, when the skin is thin, and the cow old), the veins, though little developed, are apparent, or easily become so, without being very bulky. It is necessary to have regard to their size; though they may be very easily detected, still, if they are small, the cows are not very good.

It is not always on the upper part of the perinæum, near the *vulva*, that the vein is most visible; sometimes it is discernible only in the lower part of this region, near the udder; it there appears under the form of knots, which are, at times, very large, and are observed on the perinæum and the udder, and the space between them.

Of all the marks of abundant milky secretion, the best, and indeed the only infallible marks, are

furnished by the veins of the perinæum and of the udder. But, although the surest, they are not absolutely decisive.

To estimate them, it is necessary to take into account the state of the cows in respect of flesh, the thickness of the skin, food, general activity, fatigue, journeys, heat; all the circumstances, in short, which cause variations in the general state of the circulation, and in the dilatation of the veins. It is necessary, moreover, to recollect that in both sexes all the veins are larger in the old than in the young; that the veins which encircle the udder are those which, if the cows are in milk, vary most according to the different periods of life; though scarcely apparent in youth, they are of considerable size, when, after several calvings, the operation of milking has given the gland its full development.

This proportion between the size of the veins and the milk secreted, is observed in all females without exception. The largeness of the veins and their varicose state being a consequence of the quantity of blood attracted by the activity of the milky glands, is not only the sign, but also the measure of this activity; the connection between the two phenomena is such, that, if the glands do not give an equal quantity of milk, the larger veins

are on the side of the gland which gives the larger quantity.

SECT. III.—TUFTS, FRINGES, FIGURES, OR SCUTCHEONS.

The hair on the hinder part of the body of our large ruminants grows downwards. Contrary to this, however, spots on the udder and perinæum, sometimes of considerable extent, are observed, on which the hair grows upwards. The hair so growing marks out distinct surfaces, and takes the name of tufts (*epis*), fringes (*mollettes*), figures (*gravures*), or scutcheons (*écussons*); in the case of all animals, this last is the general designation given to all parts covered with inverted hair.

From time immemorial, the inhabitants of Mont d'Or, in the Lyonnais, of the communes of St. Cyr, St. Didier, Conzon, &c., have considered the tufts, or fringes, on the lateral parts of the belly, and at the base of the flank, as indicating the milking qualities of goats. We have to consider here only tufts situated on the buttocks, the udder, and the perinæum of cows; these are the tufts which, according to the fine discovery of M. Guenon, serve to determine milking qualities.

1. *Description of the Scutcheons.*—These tufts are represented by the shaded part E in figs. 3, 7, 12, 17, 22, and by the other figures of Plates III., IV., V., VI., VII.

But we ought to premise that, in cows, they are always concealed in part by the thighs and the udder, and by the folds of the skin, which we have not represented. The consequence is, that they are not so continuous in nature as on the Plates.

As to the size of the scutcheons, it varies according as the skin is more or less folded or smooth: in the figures we have assumed that the skin is uniform; in other words, without folds, though free from stretching.

To give an idea of the differences which the scutcheons exhibit, especially in regard to size, according to the state of the skin, we have represented the same scutcheon in two ways (figs. 26 and 27). In fig. 27, the proportions kept are the same as in the other scutcheons given in the plates; but we have endeavoured to represent the folds of the skin; whereas, in fig. 26, the scutcheon is such as it would have been if the folds of the udder had been smoothed out, and the skin between the udder and thighs stretched; in a word, as if the skin covered with ascending hair had been fully extended.

This scutcheon, little developed, just as it is represented in fig. 27, was observed on a very powerful Norman cow.

For the most part, it is very easy to distinguish the scutcheons, by the upward direction of the hair which forms them. They are even sometimes surrounded by a line of bristly hair, turned backwards, and formed by the meeting of the upward and the downward hair.

Still, when the hair is very fine and very short, and mixed with long hairs, when the skin is much folded, and when the udder is of large size and pressed by the thighs, it is necessary, in order to be able to distinguish the part enclosed between the udder and the legs, and perceive the full size of the scutcheons, to examine them attentively, to place the limbs of the cow apart, and even stretch the skin in order to efface its folds.

The scutcheons may also be perceived by leaning the back of the hand against the perinæum, and then drawing the hand from above downwards. The nails rub against the ascending hair, and give sensible indication of the parts covered by it.

As the hair of the scutcheon has not the same direction as the surrounding hair, it may sometimes be distinguished by a difference in the shade reflected

by it ; but, for the most part, it is thin and fine, and allows the colour of the skin to be seen. Were we to trust only to the eye, we should often be deceived. Thus, in figs. 26, 27, the shaded part, extending from the *vulva* to the scutcheon E, represents a band of hair of a somewhat brownish hue, which covered the perinæum, and which might easily have been taken for part of the scutcheon.

In some countries dealers shave the buttocks of cows. Immediately after this operation, it becomes impossible to discern the tufts, either by sight or touch ; but the inconvenience ceases after some days. We ought to add that this shaving, intended, as the dealers say, to beautify the cow, is resorted to most frequently for the single purpose of destroying the scutcheon, and depriving buyers of one method of determining the milking qualities.

It is superfluous to add, that the cows most carefully shaven are those which were ill marked by the tuft, and that it is therefore prudent to assume that cows with the perinæum shaved are bad.

Scutcheons vary in regard to position, extent, and the figure which they represent.

With reference to their position, we will divide them into upper and lower scutcheons.

The former, which are very small, in comparison

with the latter, are situated near the *vulva* (figs. 12, 13, 14, 15, 16, S. S.), and are of rare occurrence. They consist of one or two ovals, or of one or two small bands of ascending hair, and serve to indicate how long milk continues to be given; this period is short in proportion as the scutcheons are large. It is necessary to distinguish them from the lower tufts, which are continued upwards to the *vulva*. They are separated from them by bands of descending hairs of greater or less extent (figs. 14, 16, D. D.).

The lower scutcheons, figs. 12—16, Plate I., and figs. 3—9, &c., are much larger than the upper, and exist more or less developed on almost all cows. They indicate the quantity of milk, this being in proportion to their size. Sometimes they form only a small plate, placed on the posterior face of the udder, fig. 23; at other times they cover the udder, the inner face of the limbs and thighs, the perinæum, and part of the buttocks. Figs. 3, 4, 5, &c.

We distinguish two parts in the lower tufts—one situated on the udder, the legs, and the thighs; and the other placed on the perinæum, and sometimes spread more or less on the buttocks; fig. 4, PP. The former occupies by itself figs. 11, 23.

We may call the former *mammary*, and the latter *perinean*.

The *mammary* is sometimes large, extending over the milky glands, the thighs, and the legs (Plates III., IV.); sometimes circumscribed, or more or less indented by tufts of descending hairs (Pls. VI., VII.) It sometimes terminates in the upper part of the udder, in a horizontal line, straight, as in fig. 11., or angular, as in fig. 23; but most frequently it is continued without interruption to the *perinæan* part.

This presents a large band, fig. 4, either straight, fig. 9, and bounded on the sides by two parallel lines, same figs., or by curved lines, fig. 8: it sometimes ascends to scarcely a fourth of the height of the perinæum, fig. 12; at other times it reaches or passes beyond the middle of that region, forming a band, either straight, figs. 9, 17, or bent into a square, figs. 5, 10, or truncated, figs. 12, 17, or terminated by one or several points, figs. 6, 7, 15, 24. In some cows this band reaches as far as the base of the vulva, figs. 14, 22; in others it embraces, to a greater or less extent, the lower part of this opening, figs. 3, 4, 13, 21.

The lower scutcheons are sometimes symmetrical, figs. 3, 4, 8, 9, 11, 12; sometimes without symmetry, figs. 16, 19, 24. When there is a great difference in the size of the two halves, it almost always happens that the gland on the side where the scutcheon

is most developed gives, as we shall see, more milk than that of the opposite side. What we wish to call attention to here is, that the left half of the scutcheon is almost always the larger. Thus, when the perinæan part forms a band folded into a square, it is on this side of the body that it unfolds, figs. 5, 10, 16.

The contrary we have observed only in a single instance, and it was on a bull. The perinæan part formed a band of an inch to an inch and a half in breadth, irregular in form, but situated, in a great measure, on the right side of the body. Stretching towards the upper third of the perinæum, this band formed a kind of square with a small projecting point on the right, fig. 25.

The tufts being valuable in proportion to the space which they occupy, it is of much importance to attend to all the rows of descending hairs, which lessen its size, whether these occur in the middle of the scutcheon, figs. 19, 20, 21, or form indentations on its edges, figs. 16, 18, 19, 20, 22.

These indentations, partly concealed by the folds of the skin, are sometimes perceived with difficulty. It is of much importance, however, to take them into account; for, in a great number of cows, they greatly lessen the size of the scutcheon. We often

find cows, which, at first sight, appear to have a very large scutcheon and yet are only middling, because lateral indentations greatly lessen the part of the skin covered with ascending hairs. Many blunders are committed in estimating the worth of cows, because sufficient attention is not paid to the real size of the scutcheon.

A diminution of the quantity of milk is indicated by all the interruptions in the continuity of the tufts, with the exception, however, of small oval or elliptical plates, which are found in the scutcheon on the posterior face of the udders of the best cows, figs. 3, 4, 6, 8, 9, 10, 14, and which M. Guenon considers as a mark of the best milkers. These ovals have a peculiar shade, caused by the downward direction of the hair which forms them. In the best cows, these ovals co-exist with largely-developed lower scutcheons, figs. 3, 4, 6.

Lastly, we ought still to mention that, in order to determine the size and consequent significance of a scutcheon, it is very necessary to take into consideration the state, both of the perinæum in respect of fat, and of the udder in respect of fulness. In a fat cow, with an inflated udder, the scutcheon appears larger than it really is, while, in a lean cow, with a wrinkled udder, it appears smaller.

In bulls, fig. 25, the scutcheons present the same peculiarities as in cows; they are, however, less varied in their contour, and especially much smaller in size. This may be very easily conceived from our description of scutcheons (see p. 42).

In calves, the scutcheons show the shapes which they are afterwards to assume. They are more contracted, only because the parts which they cover are slightly developed. They are easily perceived after birth, but the hair which forms them is then long, coarse, and stiff. After this hair falls off, the scutcheons of calves resemble those of cows, though of less size.

2. *Relations between the Scutcheons and the Functions of the Milky Glands.*—The relations existing between the direction of the hair of the perinæum and the activity of the milky glands, cannot be disputed. Large lower tufts are marks of good cows, whereas tufts near the vulva are observed on cows which dry up shortly after they are again in calf.

But what is the cause of these relations? What connection can there be between the hair of the perinæum and the functions of the milky gland?

Having tried to answer this question in the *Moniteur Agricole*, for 1848, we will only say in this treatise, which is wholly of a practical nature, that

the direction of the hair is subordinate to that of the arteries; that when a large plate of hair is directed from below upwards, on the posterior face of the udder, and on the perinæum, it proves that the arteries which supply the milky system are large, since they pass backwards beyond it, convey much blood, and consequently give activity to its functions. Upper tufts, placed on the sides of the vulva, prove that the arteries of the generative organs are strongly developed, reach even to the skin, and give great activity to those organs. The consequence is that, after a cow is again in calf, they draw off the blood which was flowing to the milky glands, lessen and even stop the secretion of milk.

In the bull the arteries, corresponding to the mammary arteries of the cow, being intended only for coverings of the testicles, are very slightly developed; and there, accordingly, the scutcheons are of small extent.

3. *Value of the Marks furnished by the Scutcheons.*
—After this explanation, which accounts very well for all that has been observed, it is easy to comprehend the value of the scutcheons. The more the lower ones are developed, the greater the quantity of milk; but shape is of no consequence.

Still, whatever be the cause of the relations existing between the secretion of milk and the scutcheons, these marks cannot furnish data so certain as some have affirmed them to be.

In fact, the quantity of milk and its quality do not depend solely on the form and size of the scutcheon; they depend on the food, the particular management, the climate, the season, the temperament, the size and energy of the principal internal organs, the capacity of the chest, the influence of the generative system, &c. All these circumstances cause the quantity of milk to vary without making any change on the extent of the scutcheon; consequently it is impossible that the same relation can always exist between the scutcheons and the quantities of milk. We often see cows equally well shaped, having exactly the same scutcheon, and placed under the same hygienic conditions, yet not giving either equal quantities, or equal qualities, of milk. It could not be otherwise. Assuming that a given tuft has the same value at birth, it cannot be the same in adult age; since, during life, an infinite number of circumstances occur to diversify the activity of the milky glands without changing the figure or size of the tuft.

Is it not sufficient to refer to the inequality of

milk given by the same cows, according as they have had one, two, or three calves, in order to make it clear that M. Guenon has assigned too much value to the mark which he has discovered?

It often happens that two horses, having exactly the same structure and the same external forms, have not the same energy, the same fitness for work. The difference is owing, evidently, to the temperament and the activity of the principal external organs; in other words, to conditions which it is often impossible to estimate by any direct method.

Now, seeing that temperament has an influence on muscles and bones, the action of which, however, is partly mechanical, resembling that of a lever, and exerts this influence so powerfully as to render their movements unequal in respect both of power and promptness, can we suppose that it has no influence on the entirely vital, or, at least, the entirely molecular working of the mammary gland?

It might, therefore, have been argued *à priori* that the mathematical precision, assigned to a classification of cows, is contrary to the most general laws of physiology; to propose a mark indicating that a cow will give so much milk daily, and for so many days, is to deceive ourselves, or to attempt deceiving others; the study of the phenomena of

life proves that the action of the organs depends not merely on their size and their form, but on the general condition of each individual.

We are able not only to oppose argument to the assertions of M. Guenon; we can also appeal to the difficulties hitherto experienced in applying his classification to practice. M. Guenon has not yet formed a single pupil worthy of him. And among the thousands of persons who occupy themselves with his method, is there a single one who has acquired sufficient skill to justify the claims which the author makes for it?

It may be affirmed that, to form pupils *as skilful as himself* in judging of cows, M. Guenon would not only have to teach them that a certain figure of the tuft corresponds to a certain number of pints of milk, but he would have, above all, to communicate to them his perspicacity, his talent for observation, and his great experience; he would, in fine, have to fit them for estimating, in addition to the direction of the hair of the perinæum, the whole of the marks usually employed in making choice of milk cows.

All the attempts made on the Guenon method, not excepting those of the author himself, prove the soundness of our opinion. The most skilful,

when called to decide on the quantities of cows whose yield of milk was well known, erred seven times on eight cows, and fifteen times on twenty-one. And, lest these errors may be attributed to chance, on account of the small number of cows submitted for trial, we should mention that other estimates proved erroneous, 152 times on 174 cows,* and 321 times on 352, and that the error amounted to 921 pints of milk on a total of 2683 pints;† in other words, there was error in regard to almost all the cows; and error amounting on an average, on each, to more than a third of the yield. On some individuals the estimates were wrong to the extent of from $17\frac{1}{2}$ to 21, and even from 26 to 28 pints a day!

Such is the truth as to the perfect nicety (*exactitude*) claimed for the scutcheon system. This system cannot do more than furnish an *approximate* estimate of the quantity of milk, and that in regard not to all, but only to the majority of cows. .

What, then, has led so many persons to put confidence in M. Guenon's discovery? The great talents and knowledge of the author. The system

* *Report to the Central Society of Agriculture*, by M. Yrart, in name of a Committee.

† *Report to the Minister of Agriculture*, by M. Lefebvre-Sainte-Marie, in name of a Committee.

has obtained the credit of results due to the experience of him who applied it.

If, instead of employing M. Guenon personally to give judgment on cows, he had been employed to train pupils, and teach his system as Daguerre has taught how to take likenesses, and as Vicat has taught how to make hydraulic lime, his discovery would long ago have been estimated at its true worth. And the services rendered by it would not have been less great. For although the mark furnished by the scutcheons is far from having the perfect certainty which some persons, unacquainted with physiological science, have wished to ascribe to it, it must not be thought that the mark is of no use.

By his discovery, M. Guenon has rendered great service to agriculture; the scutcheon has the advantage of furnishing a mark which can be easily discerned, and estimated even by persons of no great experience in the selection of cows—a mark perceptible on very young animals, and on bulls as well as heifers—a mark, in fine, which, when disencumbered of the complicated system in which it has been wrapped up, will, ere long, be in common use, and facilitate the increase of good cows, by not allowing any but those of good promise to be reared.

It has been proposed, as a means of ascertaining the qualities of the milk, to have regard to the fineness of the hair which forms the scutcheons, the colour of the skin, and the dust which falls from them when they are rubbed; but experience has not yet demonstrated that these marks have the value which has been ascribed to them. M. Guenon, in deciding on the qualities of the milk of 311 cows, was wrong 119 times.*

* *Report to the Minister of Agriculture*, by M. Lefebvre-Sainte-Marie.

CHAPTER III.

CLASSIFICATION OF MILK COWS ACCORDING TO THE
QUANTITY OF THEIR PRODUCE.

WE do not know any mark which can serve for methodically classing milk cows. To class them according to their scutcheons—assuming this sign to have a *precise* value, it would be necessary to have respect to the extent of surface which these layers of ascending hair occupy, or to the figure which they represent. Now, the extent could not be measured without very great difficulty; it is, moreover, liable, as we have said, to vary with the condition of the individual; then, after all, it would be necessary to compare it with the shape and weight of the cow. This method of classification would, therefore, be of very difficult application.

In regard to the shape of scutcheons, it presents so many modifications, that it would be impossible to seize their shades of difference; it would be

necessary either to confine attention to the principal differences, in which case the labour would be of little use, or to descend to details, in which case the classification would lead to frequent mistakes. For, when the tufts differ only by some parts of an inch in surface, and slight variations of shape, their influence on the functions of the glands may be neutralized by that of temperament. Accordingly, cows so marked, that, according to M. Guenon's system, they should only give from seventeen and a half to nineteen English pints, sometimes give more than those which, according to the same system, ought to give twenty-four, twenty-six, or twenty-eight pints.

Again, the shape of scutcheons is of very secondary importance; the tuft is developed sometimes longitudinally, sometimes laterally; in some cows it appears large, but being interrupted by lines of descending hair, occupies little surface; in others it seems contracted, but is uniform, continuous, and symmetrical; in all these cases it cannot have the same value. The cows in which these modifications appear, give the same quantity of milk—can it be proper to classify them differently?

In M. Guenon's Table, seven different orders of cows give daily twenty-eight English pints; eleven

different orders give twenty-four and a half pints; fourteen give twenty-one pints; sixteen give seventeen and a half pints; and eighteen give thirteen and a half pints. What interest can there be to distinguish between cows which, from having the same yield, have exactly the same value?

We will divide cows, according to the quantity of milk which they give, into four classes:—the *very good*, the *good*, the *middling*, and the *bad*. At the same time we must warn our readers, that this classification, which is founded on the whole of the marks indicative of good milkers, and which we inserted, in 1848, in the *Moniteur Agricole*, is used by us merely for the purpose of giving a summary of the marks which we have been considering.

SECT. I.—FIRST CLASS—VERY GOOD COWS.

In this class we place cows in which both parts of the lower scutcheon, viz., the mammary and the perinæan are large, continuous, and uniform; cover at least a great part of the perinæum, the udder, the inside of the thighs; extend more or less over the limbs, figs. 2, 3, 4, 5, 6, 7; and, with little or no interruption, are of oval shape, and situated on the back side of the udder, figs. 3, 4, 6.

The scutcheon, as thus described, is observed on the great majority of very good cows, but it occurs also on beasts which are scarcely good, and should be ranked among the middling.

But cows may be considered as very good, and as giving as much milk as is compatible with their size, their food, and the hygienic circumstances in which they are placed, if, even in the absence of a large development of the scutcheon, they possess the following marks:—

Large varicose veins of the perinæum, externally visible (Plates II., III.), or easily made visible by compressing them at the base of the perinæum; large and knotty veins of the udder (Plates I., II., III.), large lacteal veins often double, equal on both sides, and forming zigzags under the belly, fig. 1.

To the marks furnished by the veins and the scutcheon are to be added the following:—a homogeneous, very voluminous but yielding udder, shrinking much by milking, and covered with a thin skin and fine hair; a good constitution, an ample chest, regular appetite, and great inclination to drink; flesh, rather lean than fat; a slender supple skin; short soft hair; small head, fine horns, quick eye, gentle look, feminine air, fine neck.

The cow (Plates I., II.), which gives seventy Eng-

lish pints a-day, is a fine specimen of this class ; pelvis large, haunches widely parted, udder, veins, and scutcheons, largely developed.

Cows of this class are very rare ; those of small size give from nineteen to twenty-six pints daily, and the largest from thirty-five to fifty-two pints, or even more. When newly calved, and after several calvings, if fed with good wholesome moist and abundant food, well suited for the secretion of milk, they are able to give as much as a pint of milk for every ten ounces which they consume of hay, or its equivalent in other food.

They give milk for a very long period ; the best never become dry, but continue to be milked ; give, up to the moment of calving, seventeen and a half, twenty-one, or twenty-six pints of milk daily. The Dutch cow (Plates I., II.), was giving forty-four pints twelve months after she had had her calf.

We say that these cows *are able* to give a pint of milk for every ten ounces of food ; for, in general, they fall far short of this quantity, in consequence of the food which they receive being often too dry, never sufficiently varied, seldom rich enough in nourishing properties, and sometimes deficient in quantity.

This observation is applicable to the following classes :—

SECT. II.—SECOND CLASS—GOOD COWS.

The best cows met with in the cattle trade, and among cow-feeders in large towns, belong to this class. They have the mammary part of the scutcheon well developed, but the perinæan part is contracted or altogether wanting, figs. 8, 11; or both parts of the scutcheon are moderately developed, or slightly indented, figs. 9, 10. Figs. 12, 13, 14, 15, belong also to this class in respect of the lower scutcheon, but they mark individuals which, as indicated by the upper scutcheons *s, s, s*, give milk for a shorter time when they are again in calf.

These marks, though observed on many good cows, should not be considered certain, except when the veins of the perinæum form under the skin a net-work, which, without being very apparent, is felt by pressure; when the abdominal veins are well developed, though appearing less knotted and less prominent than in cows of the first class; and, in fine, when the udder is well developed and presents veins in considerable numbers, if not very large.

It is necessary then, as in the preceding class, to

be suspicious of cows in which the scutcheon is not accompanied by large veins. This remark is especially applicable to cows which have had several calves, and are in full milk; be the size of the scutcheon what it may, they are middling or bad if the veins of the belly are not large, and those of the udder apparent.

The general characters which depend on form and constitution combine, though less than in cows of the preceding class, the marks of good health and an excellent constitution, with those of a mild look and feminine air.

Small cows of this class give from fourteen to twenty-one pints of milk daily, and the largest from twenty-six to thirty-five pints. They are able to give three-fourths of a pint of milk for every ten ounces of hay consumed when they are fresh calved, well tended, and fed with abundance of food favourable to the secretion of milk.

They keep their milk long when they have no upper scutcheons, and when seven or eight months in calf give ten and a half, fourteen, and seventeen and a half pints a-day.

SECT. III.—THIRD CLASS—MIDDLING COWS.

When the lower tuft presents only the mammary part feebly developed or indented, and the perinæan part contracted, narrow, and irregular, figs. 16, 17, 18, 19, 20, 21, the cows are middling.

The udder is feebly developed or hard, and shrinks little by milking. The veins of the perinæum are not apparent, and those which line the lower walls of the abdomen are small, straight, and sometimes unequal. In this case the scutcheon is not symmetrical, and the cow gives more milk on the side where the vein is larger.

These cows have often a large head, and a thick stiff skin, usually in good condition, and fat; they are showy, and seem well formed. Many are ticklish and restive, and when approached put themselves in a posture of defence.

Cows of this class give, according to size, seven, nine, seventeen, to twenty-one English pints of milk. They very seldom give, even under the most favourable circumstances, half a pint for every ten ounces of hay consumed.

The milk decreases rapidly, and fails altogether when the cow is four or five months in calf.

SECT. IV.—FOURTH CLASS—BAD COWS.

Being usually in good condition and fat, these cows are the finest-looking in byres and markets; they have fleshy thighs, thick and hard skin, a stout neck, large head and horns, which are large at the base.

The udder is hard, small, muscular (*charnu*), and has its skin covered with long rough hair. No veins are seen either on the perinæum or the udder; those of the abdomen are very feebly developed, and the scutcheons are usually of very small extent, figs. 22, 23, 24.

Cows with these marks give only a few pints of milk daily, and become dry shortly after calving; some are scarcely able to supply milk for their calf, even when they are well looked after and well fed.

Sickly habits and chronic affections of the digestive organs, the chest, the womb, and the milky glands, sometimes have a very injurious effect on the secretion of milk, and cause the cows affected by them to descend from the first or second to the third, and even the fourth class.

CHAPTER IV.

DURATION AND QUALITIES OF THE MILK.

SECT. I.—MARKS FOR ASCERTAINING HOW LONG
MILK IS GIVEN.

THE length of time during which milk is given corresponds with the activity of the organs which supply it. We have just seen that the cows which give most milk a-day, also give it longest ; and hence, if no special mark is perceived, we can judge of the duration of milk by the marks which determine its quantity. Here we are rarely mistaken.

But where the upper tufts exist, figs. 12, 13, 14, 15, 16, they indicate that the cows lose their milk rapidly. M. Guenon explains himself ill when he says, page 41 of his work, "The tufts found by the reversed hair, right and left of the vulva, correspond to the reservoir of milk which is placed within the animal, and has always a remarkable correspondence with these tufts." The

very contrary is the fact. These tufts indicate that the cows are bad, and that, when again in calf, they lose their milk more rapidly than others. The larger these upper tufts are, the more quickly do they lose it, at least this is what is most frequently observed, for the worth of the upper as well as that of the lower scutcheons is liable to numerous exceptions.

If we have observed some cows which had upper tufts well developed, and kept their milk only for a short period, we have seen others which also soon lost it, and yet showed no mark from which the defect could previously have been inferred.

We ought to add, however, that we have never observed any cow very well marked in regard to veins which did not keep her milk. We repeat, therefore, that the marks of an abundant milker may be considered as indicating a long continuance of milk.

M. Guenon gives the name of *bastards* (*bâtardes*) to cows which have no upper scutcheons.

SECT. II.—MARKS FOR ASCERTAINING THE QUALITY OF THE MILK.

The quality of the milk depends much on the

quality of the food, on the period which has elapsed since calving, and on the precise moment when the milk has been taken ; immediately after calving the milk is always of bad quality, and it is always better the *older* it is, or the longer it is since the cow calved. At each milking, and as long as milk is given, that which is drawn off at first is more watery than that which is obtained last. We remark also, that the milk is improved by remaining in its reservoirs, and that cows which are milked once or twice a-day give better milk than those which are milked twice or thrice during the same time.

Cows fed with fresh watery food give a milk which is too wheyey and too poor ; those kept on dry hard food give a milk which is not abundant, but of good quality ; the cream, however, separates with difficulty if it is not aided in its ascent by a mild temperature, and by adding a little lukewarm water.

Cows whose food is varied, tolerably liquid, and devoid of bad smells and tastes, have a good milk ; those fed on articles with a strong taste, on cabbages, turnips, radishes, and garlic, give a milk which, in taste and smell, bespeaks these plants. Oleaginous food, grain, and oilcake, also produce bad

milk. In Flanders, however, rape cake is thought to produce butter of good quality.

In fine, it has been several times observed, that even the mineral poisons taken by cows and goats, in too small quantities to hurt them, reappear in their milk in quantity large enough to impart noxious properties to it.

All the causes which make the quantity of the milk to vary—labour, drinks, perspiration—also modify its composition, and consequently its qualities. In general, cows which perspire little and give most milk, give it inferior.

Temperament exerts a great influence on the quality of the milk; for, of several cows, placed under the same apparent conditions, and fed in the same way, some give a better milk than others; but the causes which determine these differences are unknown, and we cannot give any mark which ascertains their effects with certainty.

Still, according to M. Guenon, there is a correspondence between the composition of the milk and the state of the skin which covers the perinæum; a soft, unctuous skin, of a yellow saffron colour, parting with a fine yellowish dust when it is rubbed, and a fine, pliant, furry hair, indicate a milk of good quality, and rich in butter. "We have re-

peatedly had occasion," says the Hon. M. Evon, "to see cows well marked, but having the upper part of the marks bordered with coarse and thick hair, which gave milk in abundance, but not rich in cream, although they were fed like their neighbours."

As yet we know nothing positive on this subject, which has strong claims on the attention of observers.

We know only one method of ascertaining the qualities of milk, and that is by examining it; good milk is of a very slightly yellowish white colour, and of considerable consistency; its consistency may be ascertained by pouring it in little drops on a solid body. Bad milk, of a bluish and watery white, spreads in thin sheets when it is poured out.

Some persons have the organ of taste in sufficient perfection to determine the quality of the milk by sipping it.

As to the dust which adheres to the perinæum, and whose unctuous feel, fineness, and yellow colour, indicate, according to some authors, a buttery milk of good quality, we have never been able to study it, though we have often tried on cows whose milking qualities we knew to be very good.

The nature of the dust taken from the skin, and

the state of cows in regard to flesh, may one day furnish indications as to the quantities of butter contained in their milk, but science still requires to make new observations on this subject.

It is said, also, that a substance of the same nature comes off the end of the tail of good cows, and even of bulls able to get good milkers; we have never even tried to ascertain its presence. If it is wrong to be incredulous in this matter, we must plead guilty.

CHAPTER V.

SELECTION OF STOCK FOR THE PURPOSE OF BREEDING
GOOD MILK COWS.

It is more difficult to select stock for breeding good milk cows, than to select good milkers; for the breeders must, like good cows, possess well-developed properties, and must, moreover, have the faculty of transmitting these properties to their descendants. Now, this latter condition is not indicated by any known mark; we can only have probable ground for believing that animals possess it—first, by employing animals on trial (but unfortunately it is necessary, in the case of bulls at least, to change them before experience has enabled us to pass judgment on their progeny); and next, by a special application of the marks which have now been considered.

The fixed characteristics of breeds—the characteristics which have existed in races for several

generations, are those which are transmitted with most certainty. Hence, as we have said, p. 17, in speaking of breed and parentage—hence follows the necessity of choosing milk cows in good breeds and good families; and this, as we have also said, p. 17, applies particularly to breeding stock, male and female. The anatomical arrangements which cause much milk to be given by cows, combining all the properties of good milkers—large hind-quarters, wide rump, highly-developed mammary arteries and nerves, large perinæan veins, and large scutcheon—are more surely hereditary than the exceptional properties observed in some individuals, which milk well, though they have not the marks which usually distinguish good milk cows.

A cow, then, which has none of the marks of a good milker, however excellent she may be, ought not to be employed, without extreme caution, in raising stock; for it is to be feared that her progeny, male and female, will not inherit the exceptional properties which she possesses. Even should they resemble their mother, they will always be difficult of sale and unprofitable, from not possessing the marks which are now looked for in milkers. For the breeder who wishes to find buyers, it is not sufficient that his stock possess good qualities, it

is, moreover, necessary, that these qualities be manifested externally by the recognized marks.

M. Lefebvre Sainte Marie justly observes, in a report to the Minister of Agriculture, when speaking of the hereditary transmission of tufts, "nature scarcely permits us to regulate it." We add, that we must confine ourselves to the observing of her procedure, study to become acquainted with the immutable laws which she has traced out for herself, and place ourselves in such circumstances that these laws may be favourable to us.

It must not be thought, however, though it is often said, that nature is capricious, or that chance presides over her operations, because it is sometimes difficult for us to explain her works! Her procedure is uniform, and her plan always skilfully framed, but her methods are numerous, and her products diversified.

To explain the variations in the hereditary transmission of milking qualities, let us not forget that these qualities are not observed in wild cows; that they are produced, when man is able, by a particular discipline, by the act of milking, the separation of the sexes, &c., to make certain natural powers more active than others; but that the qualities disappear as soon as these powers, the nature of the soil, the

peculiarities of climate, the properties of plants, the temperament of the cows, are again allowed to act, according to the original plan of creation; so that the variations which we consider as caprices of nature, are incontestable proofs of the uniformity of her works!

It is only by examining animals carefully, by taking accurate notes of their qualities and defects, by attending to the circumstances in which individuals are produced, reared, and maintained, that we shall be able to account for what seems to us a sport or caprice of nature. It will then be easy to tell, first, how the same bull and the same cow have been able to produce three calves with different properties; and, second, to trace out the rules which we must follow, so as to be almost uniformly successful in obtaining stock of first-rate quality.

Experience proves that the qualities which are transmitted with most certainty depend on the most important organs of life; accordingly, in the forms of the viscera and the skeleton, variations are very rare, not only in breeds of the same species, but even in different species of the same genera.

On the other hand, where the transmission of properties is so uncertain as to seem the result of

caprice in nature, these properties are formed by superficial organs, by the skin, the horns, the state of the hair, &c.

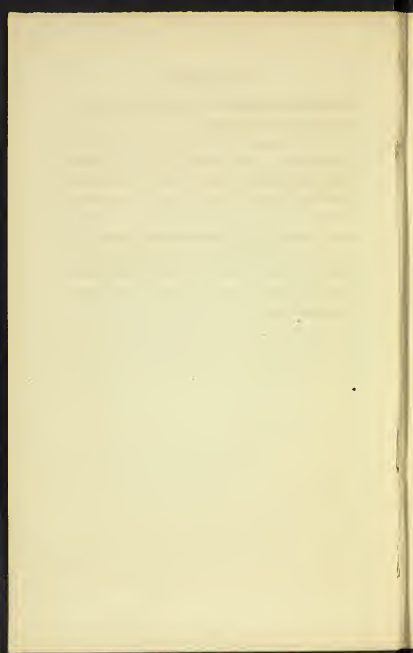
But it is in qualities which are in some sort artificial, qualities produced under the influence of domestication, and often more hurtful than useful to the health of the animals, that variations most commonly occur; these change not only with the breed of one species, but with the different individuals of one same breed, of one same half-breed, and often of one same family.

Let us bear these elementary principles of natural history and physiology in mind, and we shall comprehend how cows and bulls, well marked in regard to scutcheons, have produced stock which did not resemble them. To quote again from M. Lefebvre Sainte Marie, the influence of the scutcheons is very feeble in the act of reproduction.

In this point of view, the scutcheon is almost nothing in itself. It depends on the state of the hair, on one of the most fleeting of peculiarities, on that which is least hereditary in animals. It has no value as a mark of good getters of stock, unless it is supported by marks superior to it from their stability—a larger skeleton, double loins, a wide rump, highly-developed blood-vessels; unless it is

united with a spacious chest, round ribs, large lungs, and a strong constitution.

The more manifest the correspondence between these marks; in other words, the more the milking quality is connected with the general condition of the animal, the greater the chances of transmission; and when, with a view to reproduction, we shall make choice only of animals possessing the two-fold character of general vigour and activity of the mammary system, and place the progeny under favourable circumstances, the qualities will rarely prove defective.



AN ACCOUNT
OF THE
DIFFERENT BREEDS OF DAIRY COWS
AND
DAIRY FARMING,
IN THE UNITED KINGDOM.

IN giving a short account of the dairy cows of England, Scotland, and Ireland, the writer's remarks will, in a great measure, be confined—First, to a practical description of the different breeds, whether pure or mixed, which are considered to be best suited for the production of milk, butter, and cheese respectively; Secondly, to the produce of the different breeds as respects its quantity and quality; Thirdly, to the general management of dairy cows; and Fourthly, to the external *marks* by which dairy farmers are, or should be, guided in selecting, breeding, and purchasing animals adapted to the purposes for which they are intended, whether for the production of milk, or the making of cheese or butter. In carrying out this arrangement, it has been found

necessary to take into consideration, and to make some remarks on other breeds of cattle, not so well suited for the dairy as for fattening purposes, in consequence of the great influence these have exercised in altering the original characteristics of those breeds whose main excellence at one time consisted solely in their milk-producing properties, but which are now valuable both for milk and beef.

In the former portion of this work the physiological causes which determine the milking properties of dairy cows have been fully considered; and although in some respects the remarks there made may appear to the practical dairyman to involve much of what is purely theoretical, still it must be remembered that the whole system of M. Guenon is founded not upon theory or assumed hypothesis, but on observed facts, and therefore capable of being proved or refuted by ocular demonstration. Independently, however, of this point, the remarks of the writer are well worthy of the consideration of every dairy farmer, from the scientific, yet lucid manner in which the natural *marks*, and outward and inward configuration of a good dairy cow are described. As this department of the subject has been fully discussed in the foregoing section of this work, the objects of this appendix are altogether of a practical

character, and designed merely as a supplement to the more scientific portion by which it is preceded.

As already stated, the following remarks are intended to point out the peculiarities of the different breeds of dairy cows in this country, and the various circumstances and modes of management which have originated those systems of dairy husbandry which prevail throughout the three countries which compose the United Kingdom. In order the more effectually to accomplish these objects, the writer has visited many of the principal dairy districts, and he is gratified in being able to state, that in the prosecution of the necessary inquiries, the utmost kindness was experienced, both from dairy farmers in the country, and also from a London dairyman (Mr. Biggs, 31, Edgeware Road), all of whom frankly afforded every information in their power, without distrust, or the slightest attempt at concealment. Further acknowledgment is also due to the researches of previous writers on the subject, especially to those of Mr. Youatt, author of the interesting and elaborate work on British cattle, published in the *Farmers' Series*; also to Mr. Melburne, of Thirsk, Yorkshire, and to Mr. Aiton, of Ayrshire, one of the most experienced writers on agricultural subjects that Scotland has ever produced.

BREEDS OF DAIRY COWS

PECULIAR TO ENGLAND.

IN England there has long existed three classes or breeds of cattle, distinguished from each other by certain physical marks; among which, the length of the horn has been selected, as affording a sufficiently accurate test of the line of demarcation which separates the one from the other—these breeds being known as the *long-horned*, the *middle-horn*, and the *short-horn*. By uniting these breeds there has arisen an innumerable host of cross-bred animals, possessing properties more or less different from the sires and dams from which they have sprung. In general, the effect of a union of the long-horned cow and the short-horn bull, has been to produce an animal more valuable to the grazier than the female line from which it has sprung, while at the same time the milking properties are not materially impaired. The more, however, that

we recede from this point, the greater are the differences which occur; for if bred back to the female or long-horned side, the progeny lose the fattening property impressed on it by the first cross with the short-horn, without however retaining the milking quality of the long-horn, to which it is receding; and, on the other hand, if the first cross is bred towards the short-horn, by employing bulls of this breed, then the result is, that the propensity to fatten increases, while that of yielding milk diminishes. As it would serve no practical purpose to observe a close chronological order in describing these breeds, we shall first commence with the short-horn, because of its intrinsic importance, and the very great influence it has exerted in improving other breeds, not only in England, but also in Scotland, Ireland, and several districts on the continent of Europe. Of this breed there are two varieties, viz., the original Yorkshire or unimproved breed, and the Durham or improved short-horn breed, which owes its origin by the male line to the former.

Yorkshire Breed of Dairy Cows.—The origin of the Yorkshire cow has not been traced with sufficient accuracy to enable us to decide whence the breed to which she belongs proceeded; but the earliest information on the subject clearly points out

the counties of York and Durham as the sources or centres from which this breed has radiated to other districts of the kingdom, and from which, also, the new or improved stock of short-horns has been derived. The original or unimproved short-horns, also known as the Holderness breed, were, according to Youatt, of large size, thin skinned, sleek haired, bad handlers, rather delicate in constitution, and strikingly defective in the girth of the fore-quarters. As milkers they were unsurpassed, but they were slow feeders, and, even when fat, their flesh was of inferior quality. These defects have in a great measure been remedied by crossing with the Durham or Teeswater breed of improved short-horns—itself a descendant of the old breed—but changed in its character by careful selection and crossing with other breeds. The Yorkshire cow of the present day is a descendant of the old Holderness breed by the female side, and of the Durham or Teeswater breed by that of the sire; and this union has had the effect of improving the tendency to fatten, without producing any notable diminution of the milking properties; or at least, this diminution is more than compensated by the superior weight and quality of the carcass when fattened for the butcher. The old Holderness cow, although

unrivalled at the milking pail when young, did not continue to yield in the same abundance for more than five years; and as there was no possibility of fattening her afterwards with any chance of profit, she was sold as she was at a very low price. The improved Yorkshire cow, on the contrary, is no sooner dry than she begins to convert her food into flesh, so that, whether in milk or out of it, the food consumed is turned to profitable account. Indeed, it will seldom happen otherwise, than that the price realized for her when fat, will be greater than the sum paid for her when purchased in the height of her milking powers.

The colour of the Holderness and of the improved cross between this breed and the true short-horn, is either red, red and white, or roan. The following is a description of the Yorkshire cow as improved by an infusion of Durham blood:—*Head*, long and rather slender from eye to nose; *eyes*, bright, yet mild; *chaps*, thin and clean; *horns*, small and tapering to a point; *neck*, thin behind the ear, but gradually swelling out towards the shoulder, and free from loose skin. The *chest* deep and prominent, and not too wide—the latter characteristic being peculiarly that of the improved pure short-horn cow, who is a manufacturer of flesh and

not of milk; the *chine* fleshy and full, and the girth behind the shoulder more remarkable from being the result of depth of chest than breadth. The short *ribs* springing from the back bone in the form of an arch; *hind-quarters* broad between the haunch bones, and long from these to the point of the rump; *thighs* rather flat and thin; and *hind legs* rather *dog houghed* than straight. The skin of the Yorkshire cow is probably her worst feature, being rather too thin, and devoid of hair, to be compatible with hardness and strength of constitution; notwithstanding these defects, she is a valuable animal, when well-sheltered and well-fed. The udder is in general extraordinarily large, thin skinned and flexible, and the abdominal or milk veins, as they are commonly but erroneously termed, large, swelling, and puffed out at the junction with the udder. The udder itself is well forward on the belly and back between the legs, so as to give the appearance of great length rather than breadth, when viewed from the side; but its vertical depth, in good specimens of the Yorkshire cow, is not great. The teats are sometimes rather long, and thick at the neck, and when this is the case, there is apt to be a difficulty in retaining the milk when the udder is full; but while this is so far a defect, it renders the pro-

cess of milking much more easy and expeditious than when the teats are small, and of little compass at the junction with the udder. In those cases where the teats are apt to become gorged with milk, the udder should be emptied thrice a-day instead of twice, which will relieve the teats from pressure.

The Yorkshire cow is the great favourite with the London dairymian, as she answers all the purposes of his trade, being a good milker, and when accident or old age render it necessary to discard her, she is soon ready for the shambles. In Mr. Biggs' dairy, 31, Edgeware Road, London, there are about 400 cows constantly kept. Of these, the greater proportion are composed of the Yorkshire breed, of various degrees of affinity between the old Holderness and Durham breeds. There are also some of his cows which are longer in the horn than those already mentioned, and which are no doubt more allied to the original Holderness, or perhaps have long-horn blood in them; while there are others, whose horns and general appearance indicate their close alliance with the improved short-horn or Durham breed. Of these, the most valuable is the cross between the Holderness and Durham, as being good, both for the pail and the butcher; on the

other hand, the Holderness and long-horns give the richest milk, run soon dry, and are more difficult to fatten, while the pure short-horn gives least milk, but makes most beef in a given time. With these properties to choose amongst, it is not difficult to decide which of these breeds is most profitable to the London dairyman, whose trade is to sell as much milk as he can, and only to fatten his cows for the butcher when necessity compels him.

A Yorkshire cow in a London dairy establishment is seldom calculated to give less than twenty quarts of milk daily, for the first four months after dropping her calf, and many of this breed have been known to give from thirty to forty quarts daily for a few weeks after calving. In Mr. Biggs' dairy, twenty quarts a-day is the average quantity of a great proportion of his best cows, and many of them would continue in milk all the year round; but as this would be injurious to the animals, and would diminish the yield in the succeeding year, they are intentionally run dry about six weeks before the time of calving.

The whole quantity of milk produced in twelve-months, by one of these Yorkshire cows, when fed as in the London dairies, cannot be less than 4000 quarts or 1000 gallons. The retail price of new

milk is 16d. per gallon, and when sold wholesale to the milkman, the price realized by the dairyman is not less than 1s. per gallon, so that from this data, it appears that a cow giving 1000 gallons per annum, produces £50 worth of milk during that period. Of course, the feeding is very liberal, and from the high price of green food in the metropolis is necessarily very expensive. The milking and feeding in Mr. Biggs' dairy is as follows:—

- 4 A.M., Milked. A good milker can milk 16 cows in 2½ hours.
 4 " 1 bushel basket of brewers' grains to every two cows.
 6 " 3 bushels of Swedes or mangel-wurzel to every two cows.
 7 " 1 truss of hay to every 12 cows.
 9 " Water; which is the only time they are allowed to drink during the 24 hours in winter, and each cow drinks about 24 quarts. In summer, water is given twice.
 11½ " 1 bushel of grains to two cows.
 1 P.M., Milked again.
 2 " 3 bushels of roots to two cows.
 3½ " 1 truss of hay to every eight cows.
 In summer, the green food consists of clover, Italian rye-grass or vetches.

The cows are milked twice a-day, which occupies about two and a half hours each time. The cow houses are cleaned out five times every day, and the gutters kept sweet by allowing water to flow through them. The cows are thoroughly cleaned and combed once a-week.

From the foregoing data, the following calcula-

tion of the annual expense of *house-feeding* a London dairy cow may be deduced:—

Winter food, from 1st Oct. to 1st May (212 days):—

212 bushels of grains, at 6d.....	£5	0	6
13½ tons of Swedes and mangel, with the tops, at 20s....	13	5	0
1 ton of hay, at 90s.....	4	10	0

Summer food, from 1st May to 1st Oct. (153 days):—

11½ tons grass, clover, or vetches, at 20s.....	11	10	0
153 bushels of grains (or an equivalent), at 6d.....	3	16	6

Total expense of food.....	£38	2	0
Interest on capital, £16, at 5 per cent.....	0	16	0
Hazardous insurance or annual loss.....	0	16	0
Attendance, milking, &c.....	1	5	0
Total expense.....	£40	19	0

Produce per cow.

1000 gallons of milk, at 1s.....	£40	0	0
Calf.....	1	0	0
Manure.....	4	0	0
	£55	0	0
Deduct expense.....	40	19	0
Profit.....	£14	1	0

The daily expense is nearly 2s. 3d. per cow, and the daily yield of milk throughout the year nearly two and three-fourth gallons; and no London dairyman will long keep a cow that does not give two and a half gallons per day. In the above calculation, on charge has been made for rent of premises;

but even although £1 per cow be struck off for this item, the profit is still abundant.

In speaking thus highly of the Yorkshire cow, as in every way well adapted to the purposes of the metropolitan dairyman, it must be admitted that she is neither so good for a cheese or butter dairy as some of the smaller breeds. In the former case, quantity of milk is the desideratum, while in the two latter it is quality, or richness. Were the Yorkshire cow employed either for the production of cheese or butter, the refuse—whey and butter-milk, or skimmed milk—would be much greater than that yielded by milk of a richer quality; and, in consequence of this, the profits would be considerably diminished. In a milk dairy there is no refuse; and should the consumers in large towns complain of the inferior quality of the milk sold to them, they should remember that they cannot enjoy the luxuries of the country and those of the town at one and the same time. The consumer is entitled to be served with the milk as it comes from the cow; but when he insists on having *grass* milk in the middle of winter, he has no reason to complain should his importunity force the milk-seller to adopt the harmless device of counterfeiting an article to please his customer's eye, by the infusion of a drop

of burnt sugar, to give the milk the rich yellow appearance which it usually possesses when the cows are fed on grass.

In the London dairies, there are few of the smaller breeds of cows to be found, and the reason is, that although they may give a larger quantity of milk in proportion to the food consumed, yet they occupy stalls which would hold larger animals; and farther, when these small cows become unfit for the dairy by age or accident, they neither fatten so readily, nor retain their value so well as the larger Yorkshire breed. The established principle in all milk dairies seems to be to select animals which, when highly fed, will milk abundantly, and at the same time gradually improve in condition, or to fatten quickly when circumstances render it necessary to discard them; and for these purposes it is found most profitable to have a large cow with a good appetite, who, although she may eat more food than she can convert into milk, will nevertheless economize it by the production of fat and flesh. Where pleura-pneumonia prevails, this plan should always be adopted, as the animals are constantly in a condition fit to be slaughtered, and can therefore be sold at a good price if turned off immediately when the first symptoms of the disease are discovered;

besides, if it be considered advisable to retain them, they are better able to contend against the disease than cows badly fed and out of condition, and which, from the vital energy being low, soon fall a prey to its ravages.

The Improved Short-horn Cow.—It is now nearly a century since the first attempts to improve the short-horn breed of cattle were made on the banks of the Tees, hence their name. The soil and climate of this locality were of themselves admirably calculated to improve any breed of cattle, and no doubt conducted, in no small degree, to the success of the experiments which were made by infusing foreign blood into the veins of the old stock. What that old stock was has already been described in the foregoing section. One of the first attempts to improve that stock is supposed to have been by crossing it with the native, or wild white breed of Britain; and to this may probably be attributed the white colour so prevalent in many of the short-horns of the present day. The most successful cross, however, was that obtained by putting a short-horn bull to a *polled* Galloway cow of a red colour. The produce was a bull-calf, which, in due time, being put to a pure short-horn cow, became the sire of another bull-calf, which, in his turn,

being also put to a short-horn cow, the produce was a heifer-calf, which afterwards became the celebrated cow "Lady," from which has sprung the new race of "Improved Short-horns," so much prized for their early maturity and extraordinary propensity to fatten.

The short-horn cow of this improved breed is everything that could be desired as regards symmetry and aptitude to fatten, but it is equally true that her milking properties are not nearly equal to the race from which she has sprung by the male side. She is not a dairy cow, in the strict sense of that term, and, under the ordinary circumstances of food and climate, she is not equal to many other breeds far inferior in every other respect; but, on the other hand, when well-fed, well-housed, and kept comfortable, she is not without her merits as a milker. Under these circumstances she is always in a half fat condition; and when any contingency occurs which renders it necessary to turn her off, she is sooner ready for the butcher than any other cow of any other breed whatsoever. In Mr. Biggs' London dairy there are many excellent well-bred cows, and in every instance these are in better condition than the Yorkshire cows already described, or the long-horned cows yet to be noticed; and, as

milkers, they are only second to their relatives the Yorkshire cows. On the other hand, a pure short-horn cow, or even a three-parts bred one, is an unprofitable animal for a butter or cheese dairy, not merely because her milk is usually deficient in richness, but because of the delicacy of her constitution. In the English dairy counties, the cows are very generally allowed to pasture in the fields both in summer and winter; and, in consequence of this being the prevailing custom, it is an essential qualification that they be of a hardy constitution. Now, the pure short-horn can neither withstand cold nor heat, nor sudden transitions of temperature, without suffering injury; in the former, the flow of milk is arrested by the expenditure of the food in maintaining the vital energy (which is below an average in all animals of a lymphatic temperament), and in keeping up the normal or natural heat of a carcass always very large in proportion to the vital organs. Great heats, or sudden alternations of temperature, are also found to act very injuriously on the milking properties of the short-horn cow, in consequence of their weakening and enervating effects on a constitution not naturally the most robust. Of course these causes are also injurious to other breeds of dairy cows, but much less so, in

consequence of their smaller carcass and hardier constitution. Few dairy farmers would ever think of purchasing a pure short-horn cow of that variety known as the "Durham breed;" and even to those of them who treat their dairy stock as is done in most of the English dairy counties, it is questionable if any advantage is derived even from an infusion of the Durham blood; but to milk-dairymen who practise the system of house-feeding throughout the winter months, with abundance of rich nutritive food, few animals of any breed will pay so well as a cow with a large proportion of short-horn blood in her veins, as she will accomplish what no other cow can, namely, make both milk and beef at the same time. We shall afterwards notice those breeds in their order which have been most successfully crossed with the pure short-horn, both as regards the milking and fattening properties of the progeny.

The following is a description of a pure short-horn cow, as given by various writers on cattle and their breeds:—*Head* long and tapering; *muzzle* small and cleanly formed; *nostrils* wide and flexible, distending widely with every inspiration; *eyes* prominent, clear, and mild; *horns* short, smooth, slightly curved, cream-coloured, with pinkish flesh-coloured tips; *neck* broad above, deep and firmly

set, and totally devoid of dewlap or loose skin; *shoulders* broad at top, deep and well covered with flesh; *breast* and *brisket* broad, round, and prominent in front, projecting considerably beyond the legs, and forming almost a straight line or gentle curve downwards from the neck, and free from loose folds of skin; front *legs* widely set, with a thick muscular forearm, and a clean, small, short bone below the knee; *back* and *sides* bounded by straight parallel lines; *belly* very slightly concave just behind the brisket, then gradually, but not greatly, drooping, and forming a gentle convex curve between this point and the flank; when seen from the side, the outline of the belly is slightly undulating, but neither the apex of the concavity nor convexity far from a straight line drawn from the lowest part of the brisket to a point midway between the flank and the hock joint; *haunches* broad, square, not angular, but the bones well covered with firm flesh; not laid on in lumps, but having a rounded outline. The distance between the *haunch*-bones and *rump* more than the average of any other breed, and giving, consequently, great weight of hind-quarters; *ribs* arched, and close up to the haunch-bones; *rump* bones well covered with flesh; *hips* broad, perpendicular, and well down on

the thighs, and the hind legs very slightly bent, and small below the hock joint; *skin* soft, moderately thick, and well covered with soft, woolly hair, especially on the short ribs—generally believed to indicate a hardy constitution—and also on the belly and back, and upon the fore part of the udder. The udder itself is seldom large in the pure short-horn, but it is frequently very broad in front, and the teats are smaller than those of the true dairy cow. The *colour* is either red, red and white, white, cream or roan, or strawberry. The white is supposed to be derived from a long-back cross with the wild white breed of Britain; the red, natural to the old Holderness breed, but confirmed by the *polled* Galloway heifer, which Mr. Collings selected in his first experiment to improve the short-horn breed. The other colours are either a union of these, or accidental. The low set frame and cylindrical body are also from the Galloway cow, while longish horns of some specimens, and falling off behind the shoulders, are derived from the Holderness or original unimproved short-horn breed. Of all the different colours, the most fashionable—for it can scarcely be esteemed an essential quality—is the roan, which is also the most common.

The great characteristics of the short-horn breed

are—early maturity and aptitude to fatten. On these points Mr. Milburn of Thirsk tersely and truly remarks, that although the short-horn cow “needs nursing when young, and nourishing diet, she is a cow when another is a calf; and that the ox is fat when others of a different breed are only beginning to grow, and that either will purchase a horse before a Devon will buy a saddle.” Another writer states, that there can be no doubt of the possibility of raising a breed of *milking* short-horns which may perhaps surpass every variety of cattle in the kingdom; and to this remark Mr. Youatt adds his opinion, that “we have this breed already, and that it only requires a little care in the selection, and in crossing, to perpetuate it.” The improved short-horn cow, especially of large size, is a great consumer of food, and this has ever been a drawback to her usefulness as a mere dairy cow; and no doubt, if she is to be retained long for dairy purposes, the objection is well founded as to her profitableness; but to the London dairyman, who buys lean cows and milks and fattens them at the same time, she is seldom unprofitable, as she puts on her carcass what she refuses to the pail, and when kept only two or three years old, she is ready to be sold fat, with little or no extra feeding.

Long-Horned Dairy Cow.—Two varieties of long-horns have existed in England, the one originally found established in the district of Craven, in the West Riding of Yorkshire, and on the confines of Lancashire, and which has been long known as the original, or “Craven” breed; and the other, the “Canly” breed, an improved stock, procured by careful attention to sound principles of breeding. Of the Craven breed, Mr. Youatt says that the cattle were distinguished from the home-breds of other countries by a disproportionate length of horn. In the old breed the horn frequently projected nearly horizontally on either side; sometimes it hung down so low that the animal could scarcely graze; or it curved forward, so as almost to meet in front of the muzzle; or under the jaw, so as to lock it; or the points presented themselves against the bones of the nose and face, threatening to perforate them. These malformations have now, in a great measure, been removed by the subsequent improvement effected by careful breeders. The “Canly” breed owed its origin to Mr. Webster of Canly. This gentleman began his improvements on a stock of long-horned cows obtained from Sir Thomas Gresley’s stock. By crossing these cows with bulls from Lancashire and Westmoreland, he ultimately obtained a stock of

long-horns which became the talk and admiration of the district. From Mr. Webster's stock sprung the celebrated bull, Bloxedge—the *Hubback* of the long-horns, as Mr. Youatt appropriately terms him. The next great improver was Mr. Robert Bakewell, of Dishley, in Leicestershire. He purchased two long-horn heifers from Mr. Webster, and at the same time procured a bull of the long-horn breed from Westmoreland, and from these sprung many of the improved long-horns so much esteemed about the end of the last century. Mr. Bakewell's *four points* of breeding were, first, *beauty* of form; secondly, *utility* of form—*i. e.*, a small amount of those parts which go under the name of offal; thirdly, *quality* of the flesh; and fourthly, an early and rapid tendency to fatten. By carefully selecting the best specimens of the long-horn breed, Mr. Bakewell succeeded in producing a stock which Mr. Youatt says “was unrivalled for the *roundness* of its form, the *smallness* of its bone, and its aptitude to acquire external fat.” This stock was long celebrated under the name of the New Leicester long-horns, but now it is all but extinct. This improved breed was far inferior in its milking properties to the old and unimproved stock, and, consequently, the latter was always preferred by the small farmer and dairyman.

The result of breeding from bulls of the improved stock with cows of the old stock, or with the long-horns of other districts, was a superior aptitude, in the case of the milch-cows, to fatten when not giving milk, while, at the same time, the quantity of milk was not lessened when the animals were in milking condition. As already stated, the improved long-horn has quite disappeared from England, but there are numerous crosses from it which still bear the same name. The cows of these cross breeds are excellent milkers, and when crossed again with a short-horn bull, the progeny retains nearly all the milking properties of the dam, and has acquired much of the fattening propensity of the sire. There are a great many varieties and sub-varieties of the long-horned breed, which have long been in existence in Lancashire, Derbyshire, Staffordshire, Cheshire, Notts, Oxfordshire, and Wiltshire, each of which appear to possess certain characteristics which are either the results of soil and climate, or have been occasioned by accidental or intentional crossing among varieties of the long-horned breed, or with other breeds; but all these agree, and are distinguished from other breeds of cattle, in the length and peculiar twist of the horn.

With respect to the dairy qualifications of the

common long-horned cow of the present day, the opinion generally prevails in Lancashire—the great stronghold of the long-horns—that for the production of cheese she is unrivalled by any of the crosses which have been obtained between the long-horned and other breeds, but an admixture of short-horn blood is seldom-objected to, because of the increased tendency to fatten; and besides it is the opinion amongst the farmers of this country, that for a butter dairy, a first cross between a long-horned cow and a short-horned bull is to be preferred. This cross is hardy, and possesses both good milking and good fattening properties; but if bred back to the long-horns again, the progeny becomes very inferior, and the cows are said to be very subject to barrenness—so much so, that one-third of a whole dairy will frequently be out of calf. The prevailing colour of the cross between the long and short-horned breeds is red and white.

The following description of the long-horned breed, as it existed in Lancashire about twenty years ago, is thus given by Mr. Harrison, V. S., Lancaster:—The *head* long and thick; *forehead* broad, with the top of the head broad and flat; *eye* large; *ear* rather small; *horns* flat at the base, becoming rounder towards their apex, rather drooping from

the root, and then ascending and curling in various directions. The *neck* and *fore-quarters* thick and heavy, but fine in the *chine*; wide in the *chest*, but the *sternum* (breast-bone) does not extend so far anteriorly, nor so high as in the short-horn, thereby making the neck appear to issue low out of the chest. *Ribs* short; *body* very round, and long in the sides. The *quarters* are narrow, owing to the *ilium* not presenting so broad and horizontal a surface as in the short-horn; many of them are also roughish about the *rump*. The thigh is generally rounder and larger than that of the short-horn, and consequently affording a better round of beef. The *tail* is thick, and the bones of the leg thick and heavy. The long-horn ox weighs heavier in proportion to his size and measurement than the short-horn, and his hide is heavier, but does not handle so loose and free. The *colour* varies; but a red roan, with mottled or red legs, and a white streak down the back, is the prevailing colour.

As a contrast to this description, we give that of Mr. Marshall, when writing of the improved or Bakewellian breed of long-horns, as represented by the bull Shakespere, the property of Mr. Fowler, of Rollwright, in Oxfordshire. Mr. Fowler's cows were of the Canley breed, and had been mostly pur-

chased from Mr. Bakewell, and the bull referred to above, was also of the Canley breed, both by sire and dam. His *head*, *chap*, and *neck* remarkably fine and clean; *chest* extraordinarily deep; *brisket* down to the knees; *chine* thin, and rising above the shoulder points, leaving a hollow on each side behind them; *loin*, narrow at the chine, but remarkably wide at the hips, which protuberate in a singular manner; *quarters* long in reality, but short in appearance, occasioned by a peculiar formation of the rump. At first sight, it appears as if the tail, which stands *forward*, had been severed from the vertebræ by the chop of a cleaver, one of the vertebræ extracted, and the tail forced up, to make good the joint; an appearance, which on examination is found to be occasioned by some remarkable wreaths of fat formed round the setting of the tail; a circumstance, which in a picture would be deemed a *deformity*, but as a *point*, is held in the highest estimation. The *round bones* snug, but the thighs rather full, and remarkably let down. The *legs* short, and the *bone* fine. The *carcass* throughout (chine excepted) large, roomy, deep, and well spread. His horns apart, he has every point of a Holderness or Teeswater bull, before the latter had been improved by what is termed the *alloy*, or "Galloway" blood.

The cow of the New Leicester long-horned breed, although much handsomer in every respect than her relative, the old Craven cow, and also a much better animal to the grazier, was far inferior to her in milking qualities; and in consequence of the introduction of the improved short-horn breed, the improved long-horn was beaten out of the field as a grazier, and gave way to the older long-horn, and its crosses as milk producers.

In reviewing these statements and memoranda regarding the long-horned breed, we find, First, an original stock of long-horns, known as the Craven breed, found occupying the district of Craven, in the West Riding of Yorkshire, also the South-eastern part of Westmoreland, and also some portions of Lancashire; Secondly, the "Canley," or New Leicester improved breed; and Thirdly, cross-bred animals between the short-horn bull and cows belonging to one or other of the varieties of the long-horned breed. The cow of the older breed was noted for the rich quality of her milk, if not for its abundance; but she was coarse in the bone, thick in the hide, and slow to fatten. The cow of the improved breed was not equal to the old breed, as a milker, but she was much more easily fattened; while the cross between the short-horn bull and either

of these breeds was not only a better grazier than the female side from which she sprung, but also as good a milker. The disappearance of the celebrated stocks of improved long-horns from the localities where Webster and Bakewell did so much to improve the cattle of their day, is not greatly to be regretted, inasmuch as we have now a breed (the Teeswater) far superior to it as a producer for beef, while the ordinary long-horn cow of the present day is to be preferred, so far as dairy purposes are concerned.

The rich pasture land of Leicestershire affords ample and efficient scope for carrying on the dairy system successfully and profitably. The principal article of dairy produce manufactured is cheese, either under the name of "Stilton" or "Leicester." The former is made in the northern and eastern districts, especially in the neighbourhood of Melton, and the latter in the south and west, in the vicinity of Sapcote, Acton, and Market Bosworth, and the latter throughout the other parts of the county.

The common practice in the feeding of dairy cows, is to stall-feed in winter, with hay, straw, roots, and linseed-meal or bran; in spring, with a little clover, or Italian ryegrass; and in summer and autumn they are pastured in the fields. The kind of winter food varies considerably on different

farms, but it is a common practice to give cut straw and hay, saturated with linseed, and a little bran and oatmeal, boiled in fifteen times their volume of water. When in full milk the cows are fed with mangold-wurzel, and an increased quantity of meal and bran. Three acres of pasture grass are allowed to keep a cow from 1st May to 1st October. The following may be considered a fair approximation to the cost of maintaining a dairy cow in Leicestershire, and also the value of her annual produce, when made into Stilton cheese:—

Expense.

Summer Food.—3 acres pasture, at 35s.....	£5	5	0
Winter Food.—5 tons of roots, at 10s.....	2	10	0
1 ton of hay, at 60s.....	3	0	0
1 ton of straw, at 30s.....	1	10	0
280 lbs. of linseed meal and bran, at 1d.....	1	3	4
Attendance.....	0	10	0
Interest on £12 purchase money, at 5 per cent.....	0	12	0
Insurance on £12, at 2½ per cent.....	0	6	0
Total expense.....	£14	16	4

Produce.

500 lbs. Stilton cheese, at 7d.....	£14	11	8
Calf at a week old.....	0	15	0
Whey to pigs, and whey butter.....	1	10	0
10 tons manure, at 5s.....	2	10	0
Total produce.....	£19	6	8
Deduct cost.....	14	16	4
Profit.....	£4	10	4

In this calculation no charge is made for litter, but this will not materially affect the results, because if it be included, the quantity of manure would require to be stated higher, besides it is only the coarser and most worthless straw that is used for litter. It will be observed also that the dung is not overcharged, as the quality of the food being very superior, the value of the manure is correspondingly increased.

Another account estimates the annual produce of a Leicestershire cow as follows:—

4 cwts. cheese, at 60s.....	£12	0	0
Calf.....	1	1	0
Pork, bacon, and whey butter.....	1	10	0
	<hr/>		
	£14	11	0

In this case the feeding was not so high, as the pastures were heavy stocked in summer, the cows, however, being frequently changed; and in winter the food consisted of steamed turnips and potatoes, with straw, and a little hay, but no linseed or bran; consequently the charge against each cow would be less than in the preceding case.

In Lancashire the long-horned dairy cow (of the old breed) has long existed, and still exists, as a useful animal, suited to the purpose for which she is kept. In the survey of Lancashire the follow-

ing statement, as regards the produce and cost per annum of a dairy cow, is thus given, and it is inserted here to show the results obtained by a somewhat different mode of management than those detailed above:—

Expense.

Summer grass for 20 weeks.....	£3 13 6
Winter keep in hay.....	4 0 0
Green food.....	0 10 0
Attendance set against manure,	
Total Cost.....	£8 3 6

Produce.

Cheese, 11 lbs. weekly for 20 weeks, at 6d. per lb....	£5 10 0
Butter, 6 lbs. weekly for 20 weeks, at 1s. per lb....	6 0 0
Calf.....	1 3 6
	£12 13 6
Deduct cost.....	8 3 6
	£4 10 0

This statement is deficient in detail, and on this account can only be taken *quantum valeat*; but probably of all the three statements given above, the one most nearly in accordance with the experience of the present day is the first, which represents a higher style of feeding, and more produce than in the others, which, after all, is the most profitable, and eventually the most successful mode of conducting dairy farming, especially where a considerable portion of the land is under tillage.

MIDDLE HORN DAIRY COWS.

Of these the most marked are the Devon, Gloucester, and Hereford breeds, and the crosses which have sprung from a combination of the one with the other in endless variety. Properly speaking, neither the pure Devon cow nor the Hereford are dairy cows; but as Devonshire produces the celebrated "clouted" cream, and Hereford furnishes bulls which have improved other and coarser breeds, we have considered it interesting and useful to the dairyman to give some account of their properties and defects.

Devon Cow.—There are two kinds, the "North Devons" and "South Devons,"—the former being the purer and most esteemed of the two for producing stock for grazing and working purposes, and the latter, which is a cross or mixture between the old cattle of the county, are larger and coarser, but good both for milking and fattening.

The North Devon cow is small; and Mr. Youatt remarks that the bull of this breed is much smaller than the ox, and the cow much smaller than the bull. The colour of the "Devon" is either blood red, dark brown, or of a yellowish or chestnut colour. The first is most approved of, and is said

to indicate purity of descent, while the lighter coloured animals are said to be less healthy, and, if of a yellow hue, subject to diarrhœa. The whole contour of the body is rounded and symmetrical, and without those angular projections which so often deform the appearance of cows celebrated for their feats at the pail. The Devon cow has a full round eye, encircled with a golden coloured ring. The head is finely set, with a clean muzzle, of an orange or yellow colour. The neck is long, slender, somewhat rigid, and free from dewlap. The body very cylindrical, so much so that the belly appears to be drawn up. The back straight, and the ribs very much arched. The top of the shoulder appears to be, and really is in most cases higher than the hind quarters, giving the animal a high-bred, hunter-like appearance. The udder, teats, and milk veins are small, and she cannot therefore be considered a good dairy cow, whatever her excellencies may be as regards grazing and working. Her milk, however, although small in quantity, is unrivalled in quality, and hence, perhaps, one reason why the cream of Devonshire, whether clouted or in its natural state, is so celebrated for its excellency.

Gloucester Cow.—This is altogether a different

animal from the foregoing, being bad for grazing and working purposes, but, on the other hand, much superior at the milk pail. The old pure Gloucester cow is almost extinct, and what are now termed Gloucester cows are the offspring of the old breed from the female side, with short-horned or Hereford bulls. In the vale of Berkeley, the best dairy district in England, and from which the best cheese in the world is procured, those cows which have a strong dash of the old Gloucester breed are always preferred for dairy purposes. The infusion of short-horned or Yorkshire blood has increased the quantity, but deteriorated the quality, of the milk. The best dairy stock in the vale of Berkeley consists of cows which are the produce of Hereford bulls and Gloucester cows, more or less removed from the old Gloucester breed. This pack of cows belongs to Mr. Leonard, of Water-ends, whose cheese has long asserted its superiority by carrying off all the prizes at the agricultural exhibitions at Gloucester for many years. Indeed, so successful has he been, and so regularly did he carry off the annual prize, that the judges refused to give him the prize on a recent occasion—thinking erroneously, that as Mr. Leonard had got the prize so often, that it might be withheld without giving offence. We merely men-

tion this to show the high estimation in which Mr. Leonard's cheese is held by persons best qualified to judge of its excellency.

Mr. Leonard keeps forty cows, mostly a breed between the Gloucester cow and Hereford bull. The colours are generally brown and white in various proportions, or brindled. A brown ring around both eyes, or even around one eye; a white face, and a white belt down the back, are marks indicative of the old Gloucester breed; and if the face is mottled, it indicates a closer propinquity to the Hereford breed. Mr. Leonard's heifers are all brought into calf at three years old, as he considers that bringing them in earlier injures both their constitution and milking properties. When fed off his cows weigh from 200 to 240 lbs. per quarter, and their flesh and fat are of first-rate quality. The quantity of cheese made from each, from the 13th of April to 15th October is $2\frac{1}{2}$ lbs. daily, and from the 15th October to Christmas $1\frac{1}{2}$ lb., soon after which they run dry, and from 1st March to the middle of April 2 lbs. daily; or 183 days, $\times 2\frac{1}{2} = 457\frac{1}{2}$ lbs.; 71 days in winter $\times 1\frac{1}{2}$ lb. = $106\frac{1}{2}$, and 46 days in spring $\times 2$ lbs., = 92 lbs., or in all 610 lbs., nearly $5\frac{1}{2}$ cwt. of cheese per cow per annum. As a gallon of milk corresponds as nearly

as possible, with 1 lb. of cheese; the numbers which indicate lbs. of cheese will also indicate gallons of milk. This will give a daily yield of $2\frac{1}{2}$ gallons of milk in summer and autumn, $1\frac{1}{2}$ gallons in winter, and 2 gallons in spring, or on an average a little over 2 gallons a-day during 300 days.

Hereford Cow.—This, like the Devon, is not a dairyman's cow, but a grazier's, and is even inferior to the Devon in her milking properties; and we only notice the breed here, to remark that while the pure Herefords are bad milkers, and the purer bred the worse, a cross from a Hereford bull and a Gloucester or long-horned cow, will frequently produce an animal both good for the dairyman and the grazier. Mr. Leonard's pack of cows is a proof of this statement. The bulls of this breed most in vogue for breeding from are those of a dark-red colour. Many of them have white faces, which is considered to indicate purity of descent; while some of the most celebrated breeders will only breed from bulls which have mottled faces. These points are, however, matters of merely local interest. There is a strong general resemblance between the Hereford and Devon cow, as regards their peculiar characteristics. Both have the same round symmetrical body, imperfectly developed lactiferous apparatus,

and a strong tendency to produce beef instead of milk; this, in fact, is the characteristic of all cows shaped like the Herefords and Devons, of whatever breed they may be. Along with the Devons and Herefords may be classed the Sussex cow, which is also a bad milker. Exceptional cases occur, when a good milk cow will be found in one or other of the Devon, Hereford, or Sussex breeds; but as one swallow does not make a summer, neither does one good milker stamp its kindred with the characteristics of the real dairy cow. These three breeds of cows are all remarkable for the smallness of their udders, which seem neither to be much increased in size by long "hafting," nor greatly diminished when clean milked. This is a point the presence of which seldom fails as a test of a bad milk cow; but to this we will recur in a future portion of this work.

The mode of managing and feeding cows in Gloucestershire, is to pasture in the fields, night and day, as long as there is grass, which, in ordinary years, will be from 1st May to Christmas; and even in winter they are seldom housed, being only allowed to come into the yards at night, where they are fed with hay and straw, but rarely do they receive anything in the shape of turnips, mangold, or bruised grain. One acre and a half of pasture is allowed to

each cow, with the addition of the aftermath of another acre and a half from which hay has been mown; and as a cow eats $2\frac{1}{2}$ tons of hay in winter—the produce of $1\frac{1}{2}$ acres—she thus consumes the produce of three acres annually, besides a little straw. The cost and profit of an average cow of Mr. Leonard's stock, may be stated as follow:—

Produce.

600 lbs. of cheese, at 6d.....	£15	0	0
15 lbs. cream butter, at 11d.....	0	13	9
35 lbs. whey butter, at 9d.....	1	6	3
Whey to pigs.....	1	10	0
Calf at a week old.....	0	15	0
	<hr/>		
	£19	5	0

Expense.

Pasture, hay, and haymaking.....	£9	0	0
Attendance, milking, and cheese-making.....	1	10	0
Interest on £16 capital, at 5 per cent.....	0	16	0
Insurance, $2\frac{1}{2}$ per cent.....	0	8	0
	<hr/>		
	£11	14	0
Profit.....	7	11	0
	<hr/>		
	£19	5	0

This is very considerably above the average profits in Gloucestershire; but Mr. Leonard's land is what is termed *cheesy*, and also far above an average in point of quality. Add to these a very fine pack of cows, and very superior management in the details of cheese-making, and it is not surprising that the result is far above the average of the county.

both as regards the annual quantity produced and the price realized per lb. The average produce and expense may be pretty correctly stated thus:—

Produce.

500 lbs. of cheese, at 5½d.....	£11	9	2
20 lbs. cream butter, at 11d.....	0	18	4
30 lbs. whey butter, at 9d.....	1	2	6
Whey given to pigs.....	1	5	0
Calf at a week old.....	0	10	0
	£15	5	0
Deduct cost, as before.....	11	14	0
Profit.....	£3	11	0

The great error in the management of dairy stock in Gloucestershire, is the low feeding practised in winter. The use of roots is said to be incompatible with cheese-making, as they injure the quality; but this objection cannot be urged against farinaceous food, such as ground barley or oats. Were a small quantity of meal—say three lbs. daily—to be diffused through three gallons of water, and mixed up with a stone of cut hay or straw, and given in two feeds per day, the cows would remain in good condition all winter, give a larger quantity of milk, and, when put to grass, start into full milk at once, whereas, by the present mode, they require more than a month's grass before they arrive at their maximum. Better treatment in winter would not only increase

the quantity of cheese, but it would also gradually improve the whole pack of cows in their milking and fattening properties.

POLLED DAIRY COWS IN ENGLAND.

Suffolk Dairy Cow.—This is probably the best cow for general purposes to be found in England, whether for milk, cheese, or butter. It is for the last-named article, however, that she is chiefly kept. Her progenitors are supposed to be the polled "Galloways" of the west of Scotland. Mr. Kirby describes the Suffolk cow as having a clean throat, little dewlap, snake head, thin and short legs, ribs springing well from the centre of the back, carcass large, belly heavy, back bone ridged, chine thin and hollow, loin narrow, udder square, large, loose, and creased when empty; milk veins large, and rising in knotted puffs. The prevailing colours are red, red and white, brindled, and yellowish cream-coloured. The general appearance of the animal is angular; and she is devoid of those rounded outlines which produce so pleasing an effect on the eye by the Devons and Herefords. The Suffolk cow is, however, worth any two Devons or Herefords at the milk pail; and if displeasing to the eye of the *connoisseur* in animal beauty, she is a most valuable

animal to the dairy farmer who has a heavy rent to make up. The extraordinary quantity of eight gallons of milk per day is said sometimes to be given by a Suffolk cow during the height of the milking season, and four, five, and six gallons are not uncommon. Her milk is said to be poor in butter, but this wants confirmation, and has indeed, in some cases, been disproved by direct experiment. It would, indeed, be a somewhat remarkable piece of dairy blundering if, in a county where butter-making has been long, and is still extensively followed, a breed of cows had been located for upwards of a century, whose milk was poor in that very item which constituted a main feature of its agricultural produce, namely, butter. As well might we suppose the Yorkshire cows of the London dairies establishing themselves in the Gloucester and Cheshire, and the "Gloucesters" and mixed breeds of these counties translated and established in the London dairies. It will generally be found that experience will detect any glaring deficiency of this kind, more especially in a point which comes daily under review.

Norfolk Dairy Cow.—This, like the preceding, is polled, and is also a descendant of the Scotch Galloway breed. She is longer legged, and more

lanky than her congener the Suffolk cow, and is less adapted to dairy purposes, but said to be a better milker than the breed from which she originally sprung. As Norfolk is not a dairy county, but devoted to arable cultivation, and that of the highest order, and fattening cattle for Smithfield, it is not surprising that little or no attention has been paid to the improvement of stock for the former purpose; and we merely notice the Norfolk cow here to show that, in two neighbouring counties, there exists a breed of polled cows, originally from the same stock—the one of which stands very high as a milker, and not without merit as a kindly feeder, while the other is neither famed for the milk-pail nor the shambles. In Norfolk, the great proportion of the stock intended to be fattened are brought annually from Scotland, or the north of England.

WELSH DAIRY COWS.

Dairy Cows of Wales.—Youatt places the whole of the cows of Wales in the same category with the middle-horns, and remarks that, although stunted in growth, they bear about them, in miniature, many of the points of the Devon, Sussex, and Hereford cattle. In milking qualities they appear,

however, to surpass them. In South Wales the prevailing breeds are the "Pembroke" and "Glamorgan." The Pembrokeshire cow is usually black, with occasionally a dark brown, or, less frequently, a white face, or a white line along the back; fine boned; clean, light, neck and head; small yellow horns, turning upwards; good chine and loin; round, low-set, long barrel; thin thigh; rich, wavy hair, and an oiliness of skin which ever denote thriftiness. She is a fair average milker, and yields five lbs. of butter per week during the dairy season. The Glamorganshire cow originally was an average milker and an excellent feeder; but, through neglect, the breed to which she belonged underwent great deterioration in consequence of the farmers turning their attention to the raising of corn during the war prices. Afterwards, when these prices passed away, attempts were made to improve the breed by a foreign infusion of blood. First, a cross from the Hereford bull was tried; but this, although it increased the aptitude of the ox to fatten, diminished the milking properties of the cow. The long-horned Leicester was next tried, still without success; but ultimately this was attained by the introduction of Ayrshire cows and bulls, which, being crossed with the native breeds

both ways, produced animals well adapted for dairy purposes, especially the cross from the Ayrshire bull and the Glamorgan cow. Mr. Youatt says that this cross bears a strong resemblance to the Hereford breed in figure, although inferior in size. The average quantity of milk given by a cow of this cross, is 16 quarts per day,* and the average yield of butter is about one hundredweight during the season. In North Wales the principal dairy districts are Merionethshire, Montgomeryshire, Denbighshire, and Flintshire, but the cows are greatly mixed. In the three former districts Welsh blood prevails, but in the latter the cows are similar to those which exist in Cheshire, viz., a cross possessing a large admixture of long-horned blood. The Rev. Mr. Davis says that a Flintshire cow of the true lean milking breed gave, from May 1 to October 30, 4026 quarts of milk, which produced 358 pounds of butter, nearly equal to twenty-two quarts of milk and two pounds of butter daily, for 183 days successively. This, of course, is an exceptional case, but, in the cheese dairy, the average yield of dairy cows is three hundredweight each per annum.

* This we presume is in the height of the season, otherwise there is a discrepancy in the quantity of milk and butter yielded.

CHANNEL ISLANDS DAIRY COWS.

Alderney Cow.—This is one of the most remarkable dairy cows within the range of our subject. Her characteristics are full of contradictions. Lean and angular, she, notwithstanding, gives milk of the richest quality; ill-shaped and awkward, yet fattening rapidly when *dry*; a voracious eater, yet an inferior milker as to quantity; small of size, but delicate in constitution; the cheese and butter dairyman's friend when her milk is diluted with that of ten or a dozen ordinary cows; and his enemy if he should attempt to make either cheese or butter solely from her produce, as from the excessive richness of the milk neither will keep long; and, finally, an ornament to the rich man's lawn, yet, in aspect, altogether devoid of those rounded outlines which constitute the criterion of animal beauty. The colour of the "*Alderney*" is either a light red, dun, or fawn. The breed has been crossed successfully with the North Devon, both as regards milking and fattening properties. Crossed with a bull of any other breed, the progeny retain, to a considerable extent, the characteristic milking properties of the mother, viz., richness in the milk.

The Alderney cow might therefore be crossed with an Ayrshire bull, and the result would be highly satisfactory as to quantity and quality of milk. Judged of as a dairy cow alone, the Alderney is not profitable, as the richness of the milk does not compensate for its small quantity, and the amount of food consumed in order to produce it.

DAIRY COWS OF SCOTLAND.

THERE are three distinct breeds of cattle which have been originated in, and are peculiar to, Scotland, viz., the *Middle-horns*, *Polled Angus* and "*Galloways*," and the *Kyloe*, or West Highland. The former comprises the "*Ayrshire*," Fife, and Buchan, or Aberdeenshire breeds, but some of the latter were, and are still to be found without horns. The polled breed is found still in the greatest purity in Angus or Forfarshire, and in Galloway. The *Kyloe* embraces all the different varieties of cattle known as "*Highlanders*" and "*Shetlanders*," and which have evidently sprung from a common origin, but which have been altered from the original type by the influences of soil and climate, and also by the exertions of improvers. The *Kyloe* can scarcely be admitted into the class described by Mr. Youatt as middle-horns, for although he places them in this category, the length of their horns is often so great as to equal those of the true long-horn; and

if the relative size of the carcasses of the two breeds be taken into account, the Kyloe is better entitled to the appellation long-horn than either the Craven or Lancashire breeds.

The native breeds of cattle in Scotland are admirably adapted to the different localities in which they at present are found to exist. The Ayrshire occupies the dairy districts; the polled breeds and the Fife cattle those which are suitable both for rearing and fattening, *i. e.*, mixed arable and grazing farms; and the "Kyloe" is found in high mountainous districts where breeding and rearing, but not fattening, can be carried on at little expense. The south-west of Scotland comprises the dairy counties; the central, southern, and eastern districts constitute the mixed arable and grazing districts; and the western and northern highlands and islands are, with a few exceptions, devoted to the rearing of cattle and sheep for the southern markets.

THE AYRSHIRE DAIRY COW.

The origin of the breed to which the Ayrshire cow belongs has never been distinctly explained by writers on this subject. One writer of the last century (Colonel Fullarton) states, that Mr. Bruce Camp-

bell, a gentleman of long experience, asserts that the Ayrshire breed was introduced by the Earl of Marchmont; and Mr. Youatt remarks on this statement, that this must have occurred between the years 1724 and 1740. The cattle referred to were brought from Lord Marchmont's estates in Berwickshire to another part of his property in Kyle; but what these strangers were, or where they came from originally, is quite unknown, and probably will ever remain so, as the farther we recede from any historical or statistical fact which is perpetuated only by oral tradition, the greater is the chance either of its being lost altogether, or of becoming so vague as not to be worthy of credence. Towards the close of last century, the improved Ayrshire breed had become firmly established throughout the whole of Kyle, Carrick, and Cunningham; and about the beginning of the present century, the excellent milking properties of the cows led to their introduction into other districts in Scotland. Since then great improvements have taken place in this breed, which has become so celebrated as to find patronage, to a greater or less extent, in nearly every dairy district in the United Kingdom. Mr. Aiton, in his *Treatise on Dairy Husbandry*, one of the most useful works on the subject to be met with, thus de-

scribes the shapes most approved of in the Ayrshire dairy cow:—"Head small, but rather long and narrow at the muzzle; eye small, but smart and lively; horns small, clear, crooked, and their roots well apart; neck long and slender, tapering towards the head, with no loose skin below; shoulders thin; fore-quarters light; hind-quarters large; back straight, broad behind, joints rather loose and open; carcass deep; pelvis capacious, and wide over the hips, with round fleshy buttocks; tail long and small; legs small and short, with firm joints; udder capacious, broad and square, stretching forward, and neither fleshy, low hung, nor loose; milk veins large and prominent; teats short, all pointing outwards, and at a considerable distance from each other; skin thin and loose; hair soft and woolly. The head, bones, horns, and all parts of least value, small; and the general figure compact and well-proportioned." In this description are to be found all, or nearly all, those points which indicate the possession of first-rate milking properties, and such as we would always expect to find accompanied by that upward growth of hair on the posterior part of the udder and buttocks, which constitute what Monsieur Guenon calls a well-developed *écusson*. It is somewhat remarkable that an observer so acute as Mr. Aiton,

and whose experience has been so long continued and so varied, should never have noticed any connection between the external marks on the udder and buttocks, produced by the hair growing in a contrary direction to that of the other parts of the body, and those milking qualities which are said so confidently by M. Guenon to depend upon their presence, absence, or intermediate development. If further observation and experience should confirm M. Guenon's ingenious theory, then a plain and simple test will have been established by which to try the milking qualities of cows before purchasing them, and also in selecting heifers which are intended to be kept for dairy purposes. In analyzing Mr. Aiton's description of the various points of excellence in an Ayrshire cow, it will be seen that the head and neck are characterised by the almost total absence of flesh or lateral development, narrow muzzle, and nose scarcely widening to the eye, but gradually so to the root of the horns; neck small towards the head, and swelling gradually towards the shoulders, and devoid of loose skin or superfluous flesh. The same form prevails as we proceed backwards: *light* fore-quarters, thin shoulders, and the carcass swelling out at the sides and belly towards the haunches, and from thence to the *plumb*

of the buttocks, bounded by nearly straight lines. Looking at the animal from before, the carcass has the appearance of a blunted wedge; and so also with the neck and head, viewed separately. The physiological conformation which accompany such a figure as that of the Ayrshire cow, indicates small lateral space for the pulmonary apparatus, and a very largely-developed digestive system. The milk veins and udder partake of the same character as the stomach and viscera, being large and capacious, and free from adipose matter, while the external skin and interior walls of the milk glands are thin, flexible, and highly elastic. In the Ayrshire cow, it will be seen that the whole of her parts, and their connection with and dependence upon each other, are admirably arranged for the production of milk; and although it is true that good milkers of the Ayrshire breed are to be found in which several of Mr. Aiton's proportions are reversed, yet, as a general rule, the wedge-like form of the carcass is to be preferred—so also the fleshless neck and the cleanly cut and lengthy nose and muzzle. The milking properties of all cows are, however, dependent upon *temperament* as well as on external configuration, and hence the discrepancies which sometimes prevail between the shape and the milking powers.

The colours of Ayrshire dairy cows are either light or dark brown, brown and white, white or speckled, brindled, and black and white. The most common colours are brown, or brown and white; and the most rare are the brindled, and black and white. There are both good and bad animals of all of these colours, so that no dependence is ever placed upon any one of them for indicating the milking qualities of an animal; but careful breeders desire as much as possible to perpetuate and retain those colours by which their stock has been long known and celebrated.

The Ayrshire breed has been long celebrated for its hardy constitution and docility of temper. The temperament of the breed is highly nervous and sensitive, so that gentle treatment is indispensable in the case of the cows; for if harshly used they will quickly resent it, either by angry gestures, or, which is more felt by the dairyman, by withholding her milk, and even running herself *dry*, if the harsh treatment be long continued. The very sensitiveness of the Ayrshire cow to the treatment she receives, if properly humoured, contributes to her value, as she freely and fully yields her milk to the hand that habitually fondles her, and when in the field or byre all her gestures and movements

are quiet and placid in the presence and near approach of those who treat her kindly. The large short-horn cow is far more sluggish in her disposition, and is not so apt to resent injuries as the livelier and smaller breeds, but in her case gentle treatment will also have its due effect.

The districts in which the Ayrshire breed is principally located are the three old divisions of the county which has given the breed its appellation, namely, Kyle, Carrick, and Cunningham.* It has spread into the neighbouring counties of Wigton, Renfrew, and Lanark. In the latter county the animals are larger than in the others, which can only be accounted for from the superior quality of the soil. Strangely enough, the same superiority is observed in the Lanarkshire black-faced sheep over those of other counties of Scotland, evidently showing that the soil or climate is more favourable to the growth of both Ayrshire cattle and black-faced sheep, than in the districts where such stock are looked

* These districts seem to have been famed for different sorts of produce, for, according to the old rhyme, it was the practice to look to

"Kyle for a man,
And Carrick for a coo,
Cunningham for butter and cheese,
And Galloway for woo."

upon as in some degree indigenous. When the Ayrshire cow is transferred to the warmer climate and richer soils of England, she is said not to be so productive of milk as in her native country, and that the propensity to lay on flesh is greatly increased. No doubt a cow of this breed, taken directly from Ayrshire to the dairy counties of England, is subjected to a very great change, both of soil and climate, and frequently also of treatment. She is more exposed to irritation and annoyance from hosts of summer insects than in the cool airy fields from which she has been taken, and too often the customary supply of winter green food is nearly, or altogether withheld, so that it is not to be wondered at that she should disappoint the expectations of the purchaser. In many of the English counties too, the supply of water is confined to ponds which receive the drainings of the court, and which are in a constant state of muddiness, from the treading of the animals going to them and through them to drink. The transition from a cool climate, and an abundant supply of soft running water, to a hot sultry atmosphere and a black stagnant pond, is too great to be unfelt by the sensitive nature of the Ayrshire cow; and it can only be

her descendants in the third or fourth generation that can be expected to thrive under such circumstances, and when habit has become a second nature.

In Ayrshire, the greater proportion of the dairy cows are pastured in the open fields in summer and autumn (1st May to 1st November), and house-fed on straw and turnips in winter. The quantity of pasture required per cow on average soils is about $1\frac{1}{2}$ acres, and from four to five tons of turnips in winter, with a little bean-meal at calving-time, and as much oat-straw as she can consume. In Mr. Buttery's dairy at Calder Bank, where thirty cows are kept, the system is to pasture in summer one part of the day or night, and to house-feed on clover and vetches during the remainder. In winter the food consists of boiled turnips, cabbages, and chaff, at the rate of 32 lbs. per day to each cow, and bean-meal, ground barley, and *thirds* at the rate of 6 lbs. per day. Also, 80 stones of hay, and 120 stones of straw are consumed annually as fodder by each animal. The difference in the quantity of milk yielded by this feeding, and that usually followed in those parts of the county where turnips and straw only are given in winter, and pasture in summer, without clover and vetches, is computed to be one quart of milk daily in favour of the high feeding, and in addition the quality of

the whole milk is so greatly improved, as to yield a much larger proportion of butter—so that a quart of milk does not represent the whole increase of value obtained by the higher system of feeding adopted at Calder Bank.*

The average annual produce of milk per cow, in Mr. Buttery's dairy, is $1642\frac{1}{2}$ Scotch pints; and as, according to Davidson's tables,† a Scotch pint contains $103\cdot404$ cubic inches, and an English quart contains $67\cdot2$ cubic inches, the quantity by statute measure will be $2527\frac{1}{4}$ quarts, or, in round numbers, 632 gallons. The average produce of butter from the milk is one pound from every six Scotch pints, or 1 lb. from every $9\frac{1}{2}$ English quarts, or 274 lbs. nearly, per annum. The economical results of this

* Mr. Buttery's land-steward (Mr. Clark) at Calder Bank, states that he has always found boiled cabbages, with bean-meal, ground barley, and *thirds*, to be preferable to turnips with the same quantity of these substances, both in regard to the quantity and quality of the milk and butter; and he states further, that he considers cabbages to be the most profitable crop he grows.

† Mr. Youatt, in the volume of the *Farmers' Series* on "Cattle," has fallen into the error of stating the Scotch pint to be equal to the imperial half-gallon; but, according to Davidson, the standard pint of Scotland (which is kept in the council-house of Stirling) contains $103\cdot404$ cubic inches; and, as the English half-gallon contains $134\cdot4$ cubic inches, the proportion is as 12·29 to 16, or, in other words, the Scotch pint holds 12·29 gills, and the English half-gallon 16 gills.

system may be estimated with tolerable correctness as follows:—

Produce of each cow for one year.

274 lbs. of butter, at 10d.....	£11	8	4
570 gallons of butter-milk, at 2d.....	4	15	0
Calf, at a week old.....	0	10	0
	<hr/>		
	£16	13	4

Expense of keeping each cow.

Summer food :—

1½ acres pasture, at 30s.....	£2	12	6
Clover and vetches.....	1	0	0

Winter food :—

3 tons of turnips and cabbages, at 10s.....	1	10	0
6 lbs. of bean-meal, ground barley, and thirds, at 4d. per day, for 140 days.....	2	12	0
80 stones of hay, at 6d.....	2	0	0
Attendance, fuel, butter-making, and milk- selling, &c.....	1	0	0
Insurance, at 2½ per cent. on £12.....	0	6	0
Interest on floating capital, £12, at 5 per cent.	0	12	0

Total expense.....£11 13 0

Total produce.....16 13 4

Profit per cow.....£5 0 4

The straw and chaff consumed as fodder and litter are not charged—as the manure must be considered a full equivalent for them—even although they be calculated at a higher rate than what is usually obtained in rural districts.

In Ayrshire, all the different products of the dairy are manufactured. The ordinary calculation is, that from 60 to 62 Scotch pints of milk (equal to rather more than $23\frac{1}{2}$ Imperial gallons), will yield an Ayrshire stone (24 lbs.) of full milk cheese, and that 96 Scotch pints of skimmed milk (equal to 37 Imperial gallons), will produce the same quantity of skimmed milk cheese. Of butter, the quantity of milk required on an average to produce 24 lbs. is 180 Scotch pints, equal to 69 gallons, or nearly three gallons of milk to one pound of butter.

Quantity of Butter in the Milk of Ayrshire Cows.—The quantity of butter in a given quantity of milk, depends greatly upon the food, age, and condition of the cow, and also upon the season of the year that the experiment is made; hence a very considerable discrepancy is found to exist in the statements even of practical men on this subject. To give something like an accurate idea on this point, the safest way is to collate as many statements as possible, and from these to strike an average; so that any errors, either in over-estimating or under-estimating, may neutralise each other. The following statements regarding the quantity of butter yielded by a given quantity of the milk of Ayrshire cows, are from authorities whose great experience

and high respectability are sufficient guarantees for the integrity of their statements:—

Names of Authorities.	gals. of milk.	lbs. of butter.	gals. to 1 lb. of butter.
Mr. Burnet, Gadgirth.....	25	give..... 8	or 3-125
Mr. Alexander, Southbar... 22½.....	„	9	or 2-500
Mr. Youatt, London	—	—	2-625
Mr. Rankine.....	69	„ 24	or 2-875
Scotch pints.			
Mr. Aiton, Strathaven	8	„ 1½.....	or 2-000
Mr. Clark, Calder Bank....	6	„ 1	or 2-308
Average.....			nearly 2-572

This is a little more than $2\frac{1}{2}$ gallons of milk to one pound of butter, as the average of the Ayrshire dairies. The discrepancies of writers in regard to the weight of cheese from a given quantity of milk yielded by Ayrshire cows, are not so great as in the case of butter. The following Table gives the experience of various individuals, intimately and practically conversant with the subject:—

Weight of marketable Cheese from a given quantity of full milk.

	gals. of milk.	lbs. of cheese.	quarts to 1 lb. of cheese.
Mr. Alexander, Southbar....	22½.....	give..... 24	or 3-75
Mr. Sanderson, Blackcastle..	20½.....	„ 27½.....	or 3-80
Mr. William Peats.....	23	„ 24	or 3-85
Mr. James Peats.....	23 $\frac{3}{10}$	„ 24	or 3-975
Mr. William Aiton.....	21½.....	„ 21	or 4-029
Mr. Rankine	24 $\frac{8}{10}$	„ 24	or 4-097
Average.....			nearly 3-917

The average weight, according to the above Table,

is about $\frac{1}{16}$ th of a quart less than a gallon of milk, to one pound of cheese, which is rather above the average yield of cheese obtained in most other counties either in Scotland or England. From these data, it appears that the milk of the Ayrshire breed of cows is not only abundant in quantity, but also rich in those substances which constitute excellence of quality; and when to these qualities is added the small amount of food consumed, the result is so favourable to this breed, that few, thoroughly acquainted with the subject, will refuse to rank the Ayrshire cow amongst the most valuable for general dairy purposes in the United Kingdom. The "Kerry" and "West Highlander" may be superior in point of hardiness and endurance, and better adapted to mountainous districts, and the Yorkshire or Metropolitan cow may yield a larger quantity of milk and beef, by the consumption of an enormous amount of food, but for all medium soils and climates throughout the United Kingdom, there is no breed equal to the Ayrshire for profit, whether the produce is to be converted into cheese, butter, or veal.

On large arable farms in Ayrshire, where a dairy stock is kept, the system of *bowing*, or letting the cows to dairymen, is frequently practised. Mr.

Caird of Baldoon * gives the following statements regarding this system:—"The dairyman or *bower*, on certain terms of feeding, &c., agrees to pay a fixed sum for each cow, and manages all the details of feeding the stock, and of manufacturing their produce. The usual amount of feeding agreed on is sufficient pasture during summer, with fodder in winter, and four tons of turnips (one-half Swedish), and two bushels of beans, ground, to each cow; dairy utensils and accommodation, a dwelling-house and garden, and generally a certain quantity of potatoes for household use being also provided; and for these the dairyman, or bower, binds himself to pay so much for each cow (from £7 to £9), according to the quality of the stock and their food, and the proximity of good markets. This is found a very convenient division of labour, as attention to the details of dairy management is incompatible with a like attention to the details of an arable farm. Old cows, and such as prove bad milkers, are fed off and sold, and their places supplied by young cows either reared on the farm or bought from a breeder. In settling with the bower, three queys (that is, cows with their first calf) are reckoned as equal to

* Article "Dairy," Morton's *Cyclopedia of Agriculture*. (Blackie and Son, Glasgow.)

two cows, and farrow cows as equal to queys." The economical result of this system, and the division of profits between the farmer and bower, are as follow:—

Summer food:—Pasture, &c., $1\frac{1}{2}$ acres, at 30s.....	£2	12	6
Winter food:—4 tons of turnips, at 10s.....	2	0	0
2 bushels beans, at 5s.....	0	10	0
	<hr/>		
	£5	2	6
Rent paid by bower.....	8	0	0
	<hr/>		
	£2	17	6

Fifeshire Dairy Cow.—The breed to which the Fifeshire dairy cow belongs, is said to be the result of a cross between the Highland breed and another from some part of England. This curious admixture, it is supposed, arose from the introduction of 300 cows from England, which formed part of the dowry of Margaret, daughter of Henry VII. of England, when she was married to James IV. of Scotland; and that the town of Falkland being then the principal royal residence, these cows were sent there, and being crossed with the native Fife cattle, which were of Highland origin, produced a breed which at first went under the name of "Falklands," and afterwards by the more general appellation of the Fifeshire breed. The colour of this breed of cattle is mostly black, but some are to be

found of a light-brown or fawn, others grayish, some black and white, the former colour, however, predominating; a few red and white, but none either white or roan. Black is the colour which indicates most purity, or black with white patches; next, light-brown, then iron-gray, and the least pure are those of a brown and white colour. Some of the "Fifes" are also to be found without horns; but where this is the case, there is reason to suspect some previous cross with the polled cattle of Forfarshire, which is only separated from Fife by the estuary of the river Tay. The *head* of the true Fifeshire cow is very long, especially from the eye to the point of the nose; the *muzzle* and *cheek-bones* are fine and fleshless; the *eye* less placid than the English short-horn, as if still retaining some of the fire of the original Highland breed; *horns* small, longer than most of the middle-horns, white, with black tips, starting forward from the head, and then curling upwards. The *neck* is long and slender, especially behind the ears; *shoulder-top* narrow; breast and chest deep and prominent, but not broad; *back-bone* broad and straight; *hock-bones* wide set; *quarters* long; *tail-head* rather high; *body* long, and remarkably well filled up behind the shoulders; *ribs* moderately arched, but deep; *legs* rather long,

but the bone remarkably fine. The udder is more than ordinarily capacious, anteriorly and posteriorly, being well forward on the belly and back between the legs; teats rather longer than in other breeds. The skin of the Fifeshire cow is moderately thick and soft, but in general there is a want of softness in the hair which covers it. The most remarkable point is the size and flexibility of the udder; and as milkers, the old Fife cow is not surpassed, even by the Ayrshire. She is indeed the *Holderness* of Scotland, whether as regards bulk of carcass and aptitude to fatten, or in the *quantity* of milk given.

The Fifeshire breed is now fast disappearing before the inroads of the improved short-horn and the crosses; and, unless in a very few localities, there are few of this old valuable breed to be met with. The rage for early maturity has thrown the latter into the shade; but while in some of the warmer districts of the county this has been advantageous, there are others where it would undoubtedly have been more profitable to have retained the breed in its original integrity. The first cross between the Fife cow and short-horn bull is a very valuable animal, whether as regards milking or fattening qualities. The produce of a second or third cross

comes earlier to maturity, but is scarcely so good at the pail, and is not so large in the bone. The principal part of the cattle now bred in Fife are cross-bred; and, so far as fattening is concerned, they are more valuable and profitable than the original breed; but the prevailing opinion is, that the quality of the carcass has been injured by the introduction of the short-horn blood. Three and four year old Fife cattle, when well fed, are not surpassed, for the quality of the flesh and the quantity of the tallow, by any breed whatsoever, and equal, in these respects, to the best of the Angus, Galloway, and west Highland breeds. They are remarkable for the greatness of their girth behind the shoulder, the equal manner in which the fat and flesh are laid on and intermixed, and also for the large amount of kidney fat produced from those animals that are more than four years old.

The "Fife" heifer is seldom brought in to calve sooner than at three years old; but many of the crosses are brought in a year sooner, those of them especially which have acquired a more than average proportion of the early maturity of their short-horn progenitors.

The Fife cow will continue in full milk for six years, and can then be fattened easily to fifty im-

perial stones. The quantity of milk yielded, on an average, per annum, is about 600 gallons, and is consumed by stock calves in spring, and in summer and autumn converted into butter and cheese. The following is a fair average calculation of the expense and produce of dairy cows in Fifeshire, and is extracted from the article "Dairy" in Morton's *Cyclopedia of Agriculture*:—

Cost.

Grass, 2½ acres, in summer and autumn, at 40s.	£5	0	0
Turnips, in winter, 9½ tons, at 7s. 6d.	3	11	3
Interest on capital.	0	12	0
Attendance.	0	10	0
Total.	£9	13	3

Produce.

Calf (newly dropped)	£1	0	0
180 gallons of milk, at 4d., given to calves in spring,	3	0	0
338 " " during four months in summer,			
give 93 lbs. of butter, at 10d.	3	17	6
And of skimmed milk cheese 256 lbs., at 3d.	3	4	0
86 gallons of milk, in winter, give of butter 17 lbs.,			
at 6½d.	0	12	0½
80 gallons of skimmed milk, worth 2½d. per gallon			
for home use.	0	16	8
21 gallons of butter-milk, for four summer months,			
at 2d.	0	3	6
222 gallons of whey, at 1d.	0	18	6
Total.	£13	12	2½
Deduct cost.	9	13	3
Net profit.	£3	18	11½

As little or no food is given except grass in summer, and turnips and straw in winter, the dung is only considered equivalent in value to the straw consumed as fodder and litter.

Galloway, Angus, or Polled Breed of Dairy Cows.

—The Galloway breed of cattle has long been established in the county from which it derives its name, and the Angus is undoubtedly an offshoot from it, so that any difference which really does exist between them at the present day, is due to climate, soil, or management. The county of Forfar or Angus is situated on the eastern sea-board of Scotland, that of Galloway on the west coast; and as the annual fall of rain is much greater in the latter than in the former, there are very considerable differences in respect of the grazing capabilities of the two counties. In Galloway, the climate is moist, and well suited for pasture; whereas in Forfarshire it is drier, and consequently there is more house-feeding carried on; but the common practice in both, is to pasture the dairy stock in the fields during summer, and probably there may be from a month to six weeks longer pasture in the former than in the latter.

The greatest improver of the Angus breed that has ever turned his attention to the subject, is Mr.

Hugh Watson of Keillor, whose stock of cows, heifers, and bulls has competed so successfully at all the shows of the three great national agricultural societies in England, Scotland, and Ireland. For real symmetry of form, and quality of flesh, his stock is unrivalled; and not even the "Hereford," with all his admitted excellencies, can be compared to an average specimen of the "Keillor breed." The principal points of difference between the Angus and Galloways, consist in the shape of the head, and the texture of the skin. In the improved specimens of the former, the head is much finer in all its proportions — smaller and thinner bone, and less flesh. The skin is also softer and thinner, and the hair smoother and more silky in texture, and handles better. Mr. Youatt states that the one breed is often mistaken for the other; but that "the Angus" cattle are larger and longer in the leg, thinner in the shoulder, and flatter in the side than "the Galloways." Judging, however, from the specimens of these breeds that have been exhibited at most of the later shows of the Highland and Agricultural Society of Scotland, we are led to the conclusion that the Angus must have been greatly improved since Mr. Youatt wrote (1832), as his description applies with more truth to the Galloway than to the

Angus—the latter now being remarkably full in the shoulder, and round and low in the carcass, and, consequently, short in the legs. The Galloway has a larger body, and more bone than the Angus; and when the two breeds are placed together for comparison, as at agricultural exhibitions, these points are the first that attract attention. The cows and heifers of the former breed are also more *bull-headed* than those of the latter; still both breeds are excellent, and it is only the more perfect proportions of the Angus that induce us to give the preference to it. It is said, however, that the Galloway is more hardy, and thrives better when removed to other districts, than the Angus, on which account it is a greater favourite with the English graziers.

Both breeds are more adapted to grazing than dairy purposes, and hence they are seldom if ever found in any of the dairy counties, or in the stalls of metropolitan milkmen. Both in Angus and Galloway, the mode of management is to rear calves with the greater proportion of the milk, and any surplus is made into butter and cheese during the latter end of summer and autumn. In Galloway, the common practice is to allow each cow to suckle her own calf; but as it would be too expensive to give the entire produce to one calf, it is customary for the dairymaid

to draw off a portion of the milk—generally about one-half—before allowing the calf to suck; and when it begins to eat grass freely, a gradually diminishing quantity of milk is left in the udder every day, until the calf is weaned altogether. The economy of this practice may well be questioned; for the many changes to which the cow is exposed—at one time milked by the dairymaid—at another sucked by the calf, then the quantities which each takes altered, and finally the calf removed altogether—are all calculated to injure the milking qualities of the cow. It would be a far better plan to put two calves on one cow, and let them get the whole of the milk; and if the cow has calved early, and is well fed, she will easily bring up two pairs of calves during the season—probably the most profitable mode that can be devised of disposing of milk in those districts where the exclusive objects of the dairyman cannot be attained.

The prevailing and most approved colour of the polled cattle of Scotland is black; but some are spotted or *flaked* with white, and others brindled with black and brown stripes running insensibly into each other. Careful breeders endeavour to retain the black colour among their stock, as being an evidence of its purity. If we except the first attempt at crossing with the short-horn breed—in

which a Galloway cow produced a bull-calf, which became the progenitor of the improved short-horn breed of the present day—no other has been successful; and the Galloway breeders therefore adhere to their own breed, as in every way best adapted to their district and mode of management. There are numerous crosses between the Angus, Fife, and even with the short-horns, which are good useful country stock; but, upon the whole, there seems to be little *permanent* advantage from crossing the Angus breed with any other.

Kyloe or Highland, and Island Cattle.*—In the western and northern Highlands and Islands of Scotland, there is a peculiar breed of cattle, which has long existed, and which may, without doubt, be considered as indigenous to these districts. Of this breed there are three varieties, which have been originated by differences of soil and climate; first, the west Highland; second, the north Highland; and, thirdly, the Shetland or Island cattle. The former is the largest in size and most valuable; and the two latter are smaller, more hardy, and retain

* Sir John Sinclair traces this term to the *kyloes*, or *ferries*, across which the Highland cattle were brought when on their way to the south; others, again, trace it to the Gaelic word for Highlands, pronounced *kaél*.

much of their aboriginal character. The west Highland breed is the result of a long course of improvement upon the older and smaller Highland breed; and this improvement has been greatly favoured by the moist climate of the localities in which it has taken place, viz., the western Hebrides, and the west coast of Argyleshire. After the union between England and Scotland had taken place, an intercourse began between the graziers of the former country and the stock-farmers of the western Highlands—hitherto almost in a state of perpetual rebellion, and entire isolation—and, in course of time, a considerable number of “kyloes” found their way into Yorkshire and adjacent counties. The low price paid for these cattle, and the rapidity with which they grew when transferred to the English pastures, soon led to a steady demand for them not only in many districts of England, but also in the lowlands of Scotland. This demand stimulated improvement, and better modes of management; and the results, in our own day, are very observable in the superior quality of the stock reared in the western Highlands, to that in the northern parts of Scotland, where the cattle are far inferior in point of size and aptitude to fatten. The most common colours among the kyloes are black, brown, brindled, and

dun; but by far the greater proportion are black, which has obtained for them the common appellation of "black cattle." The kyloes are, in general, of very small size in their native districts; but when taken to the grazing districts of England and Scotland, they increase in bulk with extraordinary rapidity. They are generally bought at two to three years old, at the Falkirk trysts, or some of the west or north country markets; brought down to the lowlands in autumn, and well wintered, and fed off on grass the following summer; or, if bought in spring, they are grazed in summer, and fed off on turnips the next winter. The west Highland cattle, with such treatment, will frequently come to 45, or even 50 imperial stones, at four years old, and the smaller north country cattle to 30 or 35 stones; and, being bought in at a low price, they are generally more remunerative than the larger breeds.

The cows give little milk; but what is of it, is extremely rich; so much so, that one or two in a butter or cheese dairy are found to increase the quantity of the former and the quality of the latter. The kyloe cow, like the "Kerry," is an invaluable animal to cottiers and small farmers in mountainous districts.

IRISH DAIRY COWS.

IRISH dairy cows are supposed to have originally consisted of two distinct breeds, viz., the "Long-horned" and the "Short-horned." The former occupied the rich low-lying pastures of the best grazing counties; and the latter, commonly called "Kerries," from being more numerous in the county Kerry than elsewhere, occupied the more mountainous districts of the country. The "Kerries" are, however, still to be found in the greatest numbers, and in most perfection and purity, in the county whose name they bear. In addition to these distinct breeds, there seems to be a middle breed of cows between them, partaking somewhat of the properties of both, and occupying a medium class of soils both as regards fertility and elevation. The question in regard to the original breed of Irish cows has long been a subject of dispute; but latterly several facts have come to light, which go to prove that the original cattle of the country were all of the

short-horn breed. This belief has been occasioned by the recent researches of Mr. Wilde of Dublin, an eminent naturalist, who discovered large quantities of short ox-horns, of great antiquity, in a cave near Dunshaughlin, in Meath—one of the richest counties in Ireland. The inference drawn from this discovery as to the short-horns having been the native breed of the country, was still farther confirmed, in 1846, by fresh discoveries made at Loughgurr, near the Shannon, in the county of Limerick, by Messrs. Nolan, Glamon, and Carrol of Dublin. In a cave near Loughgurr, these gentlemen found immense quantities of the heads and horns of short-horned cattle, various bones of the Irish elk, and also of the supposed original breed of Irish swine. Still further evidence was brought to bear upon the subject by Mr. Carrol, who, in 1850, discovered, on a small island in the harbour of Wexford, the bones of a short-horned ox or cow, three feet below the surface, in a bed of marl. The horns were about four inches long from the root to the tip, beautifully curved, and about four-and-a-half inches in circumference at the root. The antiquity of these remains is undoubted, and, in absence of proofs as to the origin of the long-horned breed, would lead to the conclusion that the short-horns are of far greater

antiquity, and more entitled to the appellation of the native breed of Ireland; more especially when we find an authority such as Mr. Youatt undecided in opinion, whether the Irish long-horns are indigenous to Ireland, or were originally sent to that country from Lancashire.

Kerry Dairy Cow.—The Kerry breed is classed, by Mr. Youatt, among the middle-horns, and properly so, as it seems to have many points of resemblance to this class, especially the "Ayrshires" of Scotland, and the Alderney of the Channel Islands. The Kerry cow is a valuable animal to the hill farmer in Ireland; for she is hardy, easily kept, and gives a large quantity of milk of a rich quality, when compared with the food consumed. These properties, which are characteristic of the Kerry cow even under very inauspicious circumstances, are greatly enhanced when she is removed to a richer pasture and better climate. Under these circumstances, she will compete, in profit to the dairyman, with other and larger breeds; and when out of milk, she is easily fattened. Mr. Crosby of Ardfert Abbey, near Tralee, has a large dairy of cows of the Kerry breed; and as a correct account of the produce is kept from year to year, we are enabled, by the kindness of Mr. James Grant, landsteward at Ardfert

Abbey, to present our readers with a statement of the annual quantity of milk yielded during the seven years which ended at 1851:—

Years.	No. of cows.	Gross amount. Gallons.	Each cow. Gallons.
1845.....	28.....	13,410.....	479
1846.....	25.....	13,552.....	542
1847.....	30.....	14,277.....	475
1848.....	34.....	18,219.....	535
1849.....	47.....	21,080.....	467
1850.....	59.....	30,090.....	510
1851.....	80.....	32,021.....	411½
			<hr/> 3419½

The average quantity annually per cow, during the whole seven years, is 488 gallons, which, although small for large cows on fine land, is yet large for small Kerry cows, fed on land of so poor a quality as to be quite unfit for sustaining the larger breeds of dairy cows. Again, the milk of the small Kerry cow is extremely rich in butter—every two gallons of milk yielding one lb. of butter, according to Mr. Grant's statements—but to do this, the cows must be kept in good condition, and milked only twice a-day. Some Kerry farmers feed their cows in winter when dry, with hay and sheaf oats, and when they calve, they are put out to good grass in May; and, with this treatment, these farmers will sell 4 firkins of butter (70 lbs. each) annually making the entire produce 280 lbs. per annum, and

about 500 gallons of butter-milk. Taking the butter at 9*d.* per lb., and the sour-milk at 1½*d.* per gallon, the gross money value of each cow, exclusive of the calf, will be £10, 10*s.* for butter, and £3, 2*s.* 6*d.* for butter-milk; or, in all, £13, 12*s.* 6*d.* The cases where this sum is realized from a Kerry cow are exceptional; but they show how very valuable an animal she is to the small farmer when well attended to. In Mr. Grant's dairy, averaging from 28 to 80 cows during the seven years over which his statement extends, the average quantity of milk yielded by each cow is 488 gallons; which gives 244 lbs. of butter, and 440 gallons of butter-milk. Calculating these as before—the butter at 9*d.* per lb., and the milk at 1½*d.* per gallon—the result is £9, 3*s.* for the one, and £2, 15*s.* for the other; or, in all, £11, 18*s.* per annum, exclusive of the calf. Mr. Crosby's pack of dairy cows is not, however, exclusively composed of "Kerries," there being several of the short-horn, Ayrshire, and Irish breeds amongst them; neither are his cows kept solely for the manufacture of dairy produce. His system is a general one, consisting in rearing all the healthy calves, keeping them for two or three years, and selling them off fat. The old dairy cows are all sold fat also; and, in consequence of never being

allowed to get into low condition, they are easily fattened, and turn out well in the shambles. The following dimensions are those of a very pure and well-shaped Kerry cow, belonging to Mr. Crosby:—

	ft.	in.
Length from top of shoulder to plumb of buttocks	4	6
Girth behind shoulder	5	10
Height from ground to top of shoulder	3	6
Breadth between haunch-bones	1	8
Length from shoulder-top to root of horn (neck)	1	10
From horn to eye	0	6
From eye to end of muzzle	1	0

The colour of the hair of this cow is black, with the exception of the udder, which is white; and the texture is soft and woolly; skin supple, and soft to the touch. The general aspect of the cow is pleasing; her nose, from the eye downwards, is long, and the muzzle fine; neck long and small; carcass round and lengthy; legs short; udder *set* well up between the thighs, well forward also; teats wide, set with a forward inclination. This cow gives 15 quarts of milk daily, for the first three months after going to grass; 12 quarts daily next two months; and, during the remaining five months, she will gradually fall from that till quite dry; the annual quantity being nearly as follows:—

1st three months, 91 days, at 15 quarts	=	1365 quarts.
2d two months, 62 " at 12 "	=	744 "
3d five months, 154 " at 4 "	=	616 "

Total.....2725 quarts.

When fat, she will weigh four cwt. in the shambles, and thus retain her value to the end. A cow of this kind is an invaluable acquisition to a dairy farmer, as she is easily and cheaply fed, and yields a large quantity of rich milk, which, in whatever way it may be disposed of, will, in ordinary circumstances, realize from 4*d.* to 6*d.* per gallon. Taking the quantity of milk above stated, which is 681 gallons, at 5*d.*, the annual value is £14, 3*s.* 9*d.* The cost of keep will not exceed £8 annually; so that, in this case, allowing the dung to go for litter, and the calf for attendance, the profit will be about £6 per annum. Of course this is an extreme case; but it shows the great desirableness of procuring good animals for the dairy; for, when such are obtained, the profit is sure and abundant, whereas, in the case of bad milkers, "they will eat their head off every year." In the above table of quantities of milk yielded by Mr. Crosby's cows, there are considerable differences in comparing one year with another. The highest annual average per cow is 542 gallons in 1846, and the lowest is 412 in 1851; but, in the latter year, 12 of the cows were under three years old, which may, to a certain extent, account for the difference.

Mr. Grant states, as his experience, that cows which give a large quantity will not yield one lb.

of butter to every two gallons of milk; but those that are well fed, in good condition, and only milked twice a-day, will yield this proportion. Much, however, depends on the quality of the pasture, and the age of the cows; for when old the bones become dry, and the constitution enfeebled, and, as a natural consequence, the quantity of milk, although large, is poor in quality, especially in butter; and consequently, where this forms the principal article of sale, old cows are extremely unprofitable, rendered still more so from the large quantity of food which such animals consume, when compared with younger and more vigorous ones. The cows at Ardfert Abbey are milked twice a-day, both in summer and winter. They feed in the fields; and are not housed, even at night, from 1st May to 1st December. They are milked until about ten weeks before calving time; and the average yield of butter, during the whole period, is one lb. from every two gallons of milk. Mr. Grant considers that, by feeding with clover and vetches, the Ardfert Abbey cows would give a greater quantity of milk; but they would not be so sure for breeding, in consequence of the tendency of soft succulent food, and severe milking, to impair the constitution.

With regard to M. Guenon's test of the milking

properties of cows, Mr. Grant remarks :—" I have never yet had a cow that milked up to M. Guenon's largest quantity (1st order, No. 1), which, he says, give 24 quarts of milk daily for eight months ; but I have not any cows kept solely for the production of milk. I have, however, had different cows that gave 20 quarts daily for two or three months after calving. Our cows calve in March ; and they begin to reduce in quantity of milk early in July, by which time they are again in calf. With regard to M. Guenon's system of knowing the quantity of milk a cow will give by certain external marks, or what he calls the development of the *écusson*, I think, as a *general* rule, it is well-founded, and deserving of attention by practical men. I can testify that out of our dairy of 80 cows, our best milkers have the best developed *escutcheons* ; and further, that those which have the hair growing downwards on the hips behind, are bad milkers.

LONG-HORNED IRISH COW.

This breed, once so numerous in Ireland, is now rarely to be found pure. The introduction of the short-horn or Durham breed has gradually dispossessed the long-horns of their rich grazing grounds,

or has given rise to a mixed breed, possessing greater docility and aptitude to fatten than their predecessors. Long-horned cattle are still to be seen in the Scotch and English markets, but the greater proportion of these have a tinge of "short-horn" blood. Where the sire has been a pure short-horn, and the dam a long-horn or cross, the product is an animal possessed of good fattening properties; but where, as too often happens, both sire and dam are crosses, the progeny are very inferior, and partly compose those large droves of Irish *runts*, with unsightly horns, and rhinoceros hides, which annually make their appearance at the Scotch and English trysts and fairs, and which usually sell at a very low price; and notwithstanding, the buyers have often great difficulty in making a profit by them, in consequence of the want of those properties which constitute a kindly feeder. Independent of the influences exercised upon the long-horned breed, by the introduction of the short-horn into Ireland, there are wide discrepancies in the breed itself, resulting from many successful efforts to improve it, by bringing long-horned bulls from Lancashire and Leicestershire. The progeny of these bulls were very superior to the Irish long-horn; and either from this cause, or in consequence

of an essential difference in the two classes which constitute the long-horned breed of Ireland, there exists at present one class which has some of the finest points of excellence to be seen in any breed; while the other is so essentially bad, that all attempts at improvement have as yet proved abortive. Of the latter, many specimens are to be found in the droves which appear in the Scotch and English markets; and if anything, they are even more unthrifty feeders than those animals already mentioned, which are the progeny of cross-bred bulls and cows, having a *dash* of short-horned blood in their veins. There appear, therefore, to be at least three varieties of what are termed Irish long-horned cattle:—First, the improved long-horn, of a large size, existing in the greatest perfection in the county Roscommon; secondly, the old Irish long-horn, or small unimproved breed, generally found in the possession of small farmers in many different parts of the country; and thirdly, the cross between the short bull and long-horned cow, which are to be found on many of the rich grazing grounds of Ireland. So far as the milking properties of the long-horned breed are concerned, it appears that the cross with the short-horn has decidedly diminished these; and although the fattening qualities have

been increased, the strength of constitution has been weakened, so that more shelter and better pasturage are required. The improved long-horns of Ireland are rarely to be met with; but, where they do exist, they are highly profitable, both for the shambles and milking pail.* The unimproved long-horned cows of Ireland are, probably, the worst to fatten of all the breeds at present existing in the United Kingdom, but she is a useful animal in many respects to the small farmer and cottager, in consequence of her hardy constitution, and good milking qualities. A better system of farming will no doubt soon cause this breed to become extinct, and be succeeded by other and more generally useful breeds.

* A long-horned ox (three years old), belonging to Thomas Morton, Esq., Castlenode, Strokestown, Roscommon, exhibited at the Royal Dublin Society's show in 1846, measured as follows:—Girth, 8 ft. 7 in.; length, 5 ft. 6 in.; height, from ground to top of shoulder, 5 ft. 4 in.; length of horn, 3 ft. 6 in. According to the table, the weight of the four quarters, sinking offal, would be upwards of 12 cwts. He was sold for £50.

POINTS INDICATIVE OF A GOOD MILK COW.

AMONG practical dairymen there has long existed a number of rules, by which the milking properties of a milk cow are judged of; and as these rules are the results of long experience, transmitted from one generation to another, they contain, when collected together, the sum of all that information which is known by the name of *practical* knowledge. That this knowledge is correct, in a general way, cannot be questioned, because it is the result of actual experiments repeated, and confirmed not only for a long period of time, but in a great variety of ways, and under circumstances so different, that any errors must long ere now have been detected. Notwithstanding the existence of these established rules of judging, by external signs, of the qualities of an animal suitable for the dairy, there are very great differences in the modes and results of applying them practically. Some men have a natural turn or peculiar adroitness for minute and careful obser-

vation, which others are devoid of; and consequently the former are far more successful in rearing, selecting, or buying dairy stock, than the latter; and hence, too, we find that to these *instinctive* judges of stock, a glance or a touch will reveal a greater amount of information than the closest inspection of others. While it is necessary, however, that there should be long and habitual familiarity with recognized data in order to their being successfully applied in practice, they at the same time furnish a set of rules, a knowledge of which is of very great advantage to those who have been prevented from acquiring an experimental acquaintance with the points to which such rules refer, either by youth or want of opportunity.

The points to be attended to in judging of a good milk cow, are, by universal consent, considered to be shape and size of the animal, both as a whole, and in detail; texture of the skin and hair, development of the lactiferous parts; temperament or habit of body and dispositions; and finally, strength or endurance of constitution. A maximum development of these points marks out a first-class cow of the breed to which she belongs; but the milking properties differ in endless variety, not merely as these points are prominent or the re-

verse, but also in proportion to the circumstances of climate, soil, and treatment. The *écusson* test of M. Guenon, already described in the former section of this work, is a new element in the question; and when fully established, and better understood, will probably occupy the first rank among the external signs which indicate the natural milking properties of cows; but as yet it is rarely recognized in Britain; and there are few farmers, even in the best dairy counties, that have even heard of such a test. How far M. Guenon's observations have been borne out by facts supplied by the examination of a great many dairy cows in our own country, both by the writer and others, will be discussed at the close of this section; meantime, we shall direct the reader's attention to those points which experience has proved to possess a marked influence on the milking properties of cows.

Shape.—Whatever may be the breed to which a cow belongs, there are certain points of configuration which are considered essential as regards her milking properties. There may be, and are frequently, great discrepancies between the one and the other; but still, generally speaking, the rule holds good that, all things being alike, the cow which approaches nearest to a certain standard will

be the best milker. The *head* must be rather lengthy, especially from the eye to the point of the nose; the *nose* and *muzzle* should be cleanly cut, and free from thick skin or fleshy lumps; the *cheek-bones* thin, and, in like manner, devoid of thick skin or flesh (not thick chapped); *eye* prominent, of a placid and benignant expression, with little of the white exposed to view. If horned, the *horns* should taper gradually to a point, and have a clean surface, free from rugosities: the breed will determine the shape and set of the horns. The *neck* should be long, thin, and free from loose skin. A good milk cow may be deer or ewe-necked, but never bull-necked. The *chest* and *breast* should be deep, rather than broad, and the brisket should project forwards and downwards; and, whether large or otherwise, should be round, well shaped, and without loose folds of skin depending from it. The *girth*, behind the shoulders, moderate, and arising more from depth than breadth of chest; *shoulders* rather narrow at top; *back-bone* on a line with the shoulder-top; *ribs* arched, and well home to the haunch-bones, which should be wide apart, and form a straight line across, neither depressed in the centre, at the lumbar vertebrae, nor drooping at the extremities; *hind-quarters* lengthy, and the

rump, or tail-top, nearly on a line with the backbone; *thighs* rather thin, but broad, well spread, and giving plenty of room for the udder; *belly* projecting outwards rather than downwards, with plenty of room for food; the *udder* should be large in a lineal direction, that is, well backward as well as upward, between the hind legs and forward on the belly; also broad in front, filling up the space between the lower flanks, but rather short vertically; a deep hanging udder, from its swinging motion, being always the cause of great fatigue to the animal when walking; the teats should be moderately long, straight, and equal in thickness from the udder to the point, and also at considerable and equal distances from each other: the two front teats especially should be well apart, and the direction of all four should be outward. When full of milk, the udder should be greatly enlarged in size, and, when newly emptied, shrink in a corresponding degree, and the skin gather into soft creases. The *mammary glands*, running on each side of the belly, large throughout their whole course, and swelling into large *puffs* at or near their junction with the udder; *thigh veins* also large and easily felt by the hand.

Of all these shapes the more important are the long, finely-formed *head*; long, thin *neck*; *rump*

nearly on a line with the back-bone; broad *quarters*, long *udder* from back to front, and large *veins* underneath the belly, and downwards, from the loins and thigh, to the udder. When seen in front, the body of a good milk cow should present the appearance of a blunted wedge, the apex of which is the breast and shoulder. Seen from behind, she should present a square well-spread shape. Seen sideways, she should be lengthy, but not lanky.

SKIN, HAIR, AND COLOUR.

The skin is ever a true index of the milking properties of a cow. It should be soft and flexible on every part of the body, especially on the back ribs, and also on the rump bones, situated on each side of the insertion of the tail. The latter is a point much prized by dairymen; so much that a very successful farmer in Cheshire, Mr. Jabez Wright, told the writer that, in buying a cow, if the skin on the rump was soft and easily lifted from the bone, he never sought for further signs of her milking powers. Of course, while feeling this point, Mr. Wright's practised eye would at once take in, at a glance, those other points which constitute the *toute-ensemble* of a good milker; but the one

referred to he considers indispensable. The skin in these parts will vary, however, according to the condition of the cow. If full of flesh, the skin may be loose, and yet the animal be a poor milker; but if in lean condition, with loose skin on the rump bones, she will milk well, and fatten quickly when *dry*. The skin on the ribs is the next in importance; and if it corresponds in softness and looseness with that on the rump bones, another point of excellence is established. These two points, conjoined, are correct exponents of the internal constitution, and are always accompanied with more than an average tendency to milk freely and fatten rapidly. The former indicates a more than ordinary power of producing milk; the latter a great aptitude to fatten; and their conjoined presence indicates the union of both tendencies. The skin on the udder generally partakes of the quality of that on the rump and ribs, and will therefore be soft and flexible, in proportion to their softness and flexibility. Still there is a difference to be observed, viz. that the skin of the udder must not be thick, whereas thickness on the rump and ribs is quite consistent with the best properties, provided it be loose, soft, and flexible. In fact, a thickish, soft hide generally indicates hardness of constitution, from its greater capability to

resist or modify external influences, whether of climate or cuticular irritation from the bites of insects.

The hair is the next point to be studied. It should be moderately long, closely set, and, above all, soft and woolly. As the thick soft skin is an indication of hardness, much more so is this the case when covered with long, thick, woolly hair. A bare, hard-haired cow is ever to be avoided by the dairyman as well as the grazier. If even a moderate milker, yet she will be a great eater, and never pay for her food.

Colour is immaterial, and depends on the breed. A brown cow is supposed to give milk rich in butter, while a black one gives much milk, which is poorer in butter. A white cow looks larger than she really is, while a black one looks smaller. According to the law of absorption and radiation of heat, a black cow will absorb much solar heat in summer, and radiate, or throw off, a large amount of animal heat in winter. On the other hand, a white cow will absorb less heat in summer and radiate less in winter; and the practical result is, that the black cow is too warm in summer and too cold in winter, while the white one is cool in summer and warm in winter. This is somewhat opposed

to the popular idea on the subject, which attributes a cold appearance to a white animal in winter, and the contrary to a black one; but that this is a popular fallacy may be seen, independent of the scientific explanation of the phenomenon, from the fact that the native or wild breed of cattle in Britain were all white, and are so still in Chillingham Park, where the animals are never housed; and also from the fact that white is the prevailing colour of all arctic animals—bears, foxes, and hares all being of this hue. The practical conclusions deducible from the fact, that a black cow absorbs much heat in summer and radiates much in winter, are, First, She must be more susceptible of, and more injured by, sudden atmospheric changes than a white cow; Secondly, In cold weather she will lose much heat by radiation, and hence must eat more food to keep up the animal heat at its proper temperature. Again, in warm weather she will require less food for this purpose than a white cow, but will be oppressed with heat, and more liable to profuse perspirations. The result of these conditions on the milking properties of the two animals will be, that the black cow will be liable to have her milk injured in quality by excess of heat, and consequent irritation of the system, and profuse perspirations

in summer; while, on the other hand, the cream or oily part of it will be diminished in quantity, in cold weather, by the cow using more of the food she eats to keep up the natural heat of her blood. This accounts, in some degree, for the popular notion that the milk of a black cow is generally poorer in butter than that of a white or mixed colour.

TEMPERAMENT AND CONSTITUTION.

Animals, like human beings, are differently developed in their nervous, sanguineous, muscular, and lymphatic constitutions, and their tempers and dispositions vary accordingly. Each breed of cattle is characterized by peculiarities of temper, activity, and endurance. The Ayrshire cow presents a good specimen of a union of the nervous and sanguine temperaments, in which the latter predominates. The north Highland kyloe also possesses a union of the same temperaments; but the nervous predominates, which gives her a restless, and even fierce aspect. The short-horn possesses a temperament in which the lymphatic is largely developed; she is slow and sluggish, but all the more disposed to fatten on that account. The muscular temperament is disappearing before the march of improve-

ment, as animals of this description are neither good for the grazier nor the dairy, being fleshy, thick-skinned, and poor milkers. Constitution is the result of natural temperament and physical configuration, but each temperament has its own particular diseases to which it is liable. The nervous temperament predisposes to fevers, the sanguine to inflammations, and the lymphatic to lung diseases; but as these temperaments are never found distinct, but always combined together in some proportion or other, the peculiar diseases to which these unions give rise are as endless as the constitutions themselves.

Atmospheric causes, and artificial treatment, also impress certain physiological characteristics upon cattle. Exposure to cold, when young, has a tendency to develop those parts of the system whose office it is to protect the vital functions from being injured by this cause. When an animal is early exposed to cold, the hide thickens, and becomes covered with long thick hair. It becomes inured to exposure, and is little affected by atmospheric changes. A long continuance of such treatment, as in the case of the kyloes, from one generation to another, soon impresses a peculiar habit of growth upon them; and this, in time, settles into a fixed and

permanent temperament, or physiological character. Even, however, among individuals of the same breed, exposed to the same external influences, there are great discrepancies as regards individual constitution. Some are more hardy than others, simply because certain causes, either accidentally or designedly induced, have given them better digestive powers, stronger lungs, and more vital energy. This superiority of constitution, whatever may be its cause, is generally indicated by a large round body, a soft flexible skin, by no means thin, which is covered with a thick coat of soft, silky, or woolly hair. A large paunch is usually the sign of an animal which can and will consume a great quantity of fodder in the shape of hay or straw; and this we know, by experience, to be one of the best indications of a good, healthy, hardy, thriving animal, whether cow, horse, or sheep. Strength of constitution can be transmitted as well as other peculiarities; so that a careful breeder, by always breeding from animals that he knows to be of good constitution, will ultimately succeed in strengthening and improving his stock.

M. GUENON'S TEST OF THE MILKING PROPERTIES
OF A COW.

The writer has examined many hundreds of dairy

cows in Britain; and the conclusion arrived at, in regard to M. Guenon's test of judging of the milking properties of a cow by the development of the *écusson*, is that, in a very large majority of cases, it is borne out by facts. In a London dairy belonging to Mr. Biggs, 31, Edgeware Road, where about 400 cows are kept, and where nine-tenths of them are far above average milkers, the development or upward growth of the hair on the posterior part of the udder, thighs, and perinæum, was too remarkable to be accounted for by accidental causes. As well might it be said that all other tests, such as length of head, softness and flexibility of skin, and wide quarters, were accidental, and had no reference to the milking properties of a cow. When a phenomenon presents itself over and over again, accompanied, in a majority of cases, by certain results, we may be certain that it is not accidental, but natural; and while we may be unable to account for these results upon satisfactory grounds, it is neither philosophical nor prudent to deny or ignore the connection between the one and the other, and thus to forfeit the advantages which the fact itself is calculated to afford.

The first two cows examined in Mr. Biggs' dairy were of the improved short-horn breed. They were

large handsome animals, in high condition ; and, on examination, it was found that the upward growth of the hair did not extend much beyond the top of the udder ; but there were two tufts of hair on each, one on each side, a little higher up, which had an upward direction. The facts regarding these cows were, that they were not good milkers, ran soon dry, and got fat. The next cow examined was a Yorkshire and Durham cross, of a middle size, that gave 20 quarts per day for three months after calving ; and was a good, steady milker. She had a straight back from the shoulder to the loins, which were remarkably broad, but the quarters were coarse and drooping ; the breast and chest remarkably projecting, with a thin, drooping, ill-shaped neck. The skin was rather thick, and by no means flexible on the ribs, but very much so on the rump bones. The milk veins were much swollen and knotted. The escutcheon was symmetrical, and well developed. This cow is full of contradictions ;—a good middle, but drooping very much both at the quarters and neck ; bad skin on the ribs, but remarkably fine on the rump. The largely-developed escutcheon and mammary apparatus seem to have given the preponderance in favour of the good qualities, and to have produced an animal, in

all respects, far above an average milker. Another large red and white cow, of the Yorkshire breed, was examined and measured. Length, from shoulder-top to plumb of buttocks, 5 feet 3 inches; girth, behind shoulder, 6 feet 9 inches; height 4 feet 8 inches; neck 2 feet 4 inches. The head uncommonly long; back very level; brisket projecting before, and drooping between the legs to an almost unsightly degree; forearm of the leg very broad; udder very large, long teats, placed very far asunder. This cow had a very large but not a very symmetrical escutcheon; for although it ran up in a broad band from the udder, it suddenly swerved to one side. Her character previously was that of a first-rate milker, but she had not been dry for twelve months, as she had *slinked* her calf at the six months, at which time she was in full milk; but notwithstanding this mishap, she gave at the rate of twenty quarts per day, five weeks afterwards. Another instance may be mentioned, as confirmatory of another phase of M. Guenon's theory. A very fine young cow was found to have a good escutcheon, which, however, when above the udder, was all on one side. The cowman's statement regarding her, was that she went soonest dry, and gave least milk on the side where the escutcheon was wanting. The

rest of the examinations were nearly a repetition of the foregoing, with the exception of two cases where two cows were standing in a stall together, the one had a good escutcheon, and the other only moderately so, but the latter was by far the best milker. Upon closer inspection and handling, the latter cow was found to have a particularly soft and flexible skin, covered with fine woolly hair; while that of the other was hard, thin, and covered with short, hard hair. When such cases occur, they do not disprove the theory of escutcheons, but rather show that, as in one case already detailed, one good point may be neutralized by several bad ones, and hence it is, that M. Guenon's test will appear sometimes to fail altogether.

In Mr. Leonard's stock of forty dairy cows on his farm of Water-ends, in the vale of Berkeley, Gloucestershire—probably the finest pack in the county—the uniform development of the upward growth of hair on the udder and perinæum is very remarkable on all the best cows, and indeed there are only a very few of them that can be called inferior. Mr. Leonard's son, who accompanied the writer, and gave the necessary information regarding the milking powers of the different animals, but who had never heard of M. Guenon's test, admitted its

general correctness in most of the cases to which it was applied. Two cows very like each other, of the same age, and both bred from the same bull, were pointed out as having something peculiar in their relative powers of milking. Upon examination, one of them was found to have a very superior escutcheon, while that of the other was as much inferior. The former was a first-rate milker, while the other was one of the worst in the whole pack. With the exception of the development of the *écusson*, there was so little difference otherwise in the appearance of these two cows, that all the ordinary tests would have failed to determine beforehand which was the good milker and which the bad. Among twenty young cows pasturing in one field, M. Guenon's test was admitted by Mr. Leonard to be uniformly correct.

There appears, however, to be something characteristic in the escutcheons of different breeds of dairy cows; for while some have them in general largely developed, there are others in which they are not so; but which are, notwithstanding, quite as good milkers. The test is, therefore, more correct when applied to distinguish the milking properties of animals of the same breed, than it is when adopted as an index for judging of those of different

breeds. This principle was illustrated in the case of two packs of dairy cows in Cheshire, the one belonging to Mr. Jabez Wright, and consisting of a mixture of the long-horned and short-horned breeds, and the other to Mr. Andrew Hannay of Henbury, who has a dairy of very fine "Ayrshires." In the former, some of the cows had very fairly developed escutcheons, but there were great differences in others; so much so, that one cow would present a large development, while another did not extend above the udder. The difference in the milking qualities did not exactly correspond to these discrepancies, showing either that the test was incorrect, or that the great variety of breeds among the cows rendered it necessary to modify or alter its application. In Mr. Hannay's pack of cows, the development of the escutcheon was found to be very uniform, although by no means so great as might have been expected from the known milking properties of the animals. Compared with Mr. Wright's cows, Mr. Hannay's pack would have been considered inferior if judged of by the escutcheon test, whereas the fact was that they were superior. One principle seems, however, to be established, viz., that all things being alike as regards shape, texture of skin, &c., cows with well developed escutcheons will, in a large

majority of cases, be found to be the best milkers, and above an average; while, on the other hand, those with very small escutcheons will be found under or at most not above, an average in their milking properties. We shall conclude by giving the opinion of a purely practical man on this point. Mr. Grant, of Ardfert Abbey, Tralee, says, in a communication to the author, "With regard to Monsieur Frangois Guenon's system of ascertaining the quantities of milk a cow will give by certain external signs, or what he calls the development of the *écusson*, I think, as a general rule, his opinion is well founded, and deserving of notice. I can testify that, out of our dairy of eighty cows, the best milkers have the largest development of the *écusson*; and further, that those which have the hair growing downwards are bad milkers. The short hair on the hips of bulls grows generally downwards, and that on cows upwards; and you may rest satisfied that there is something in the internal economy which produces this difference."

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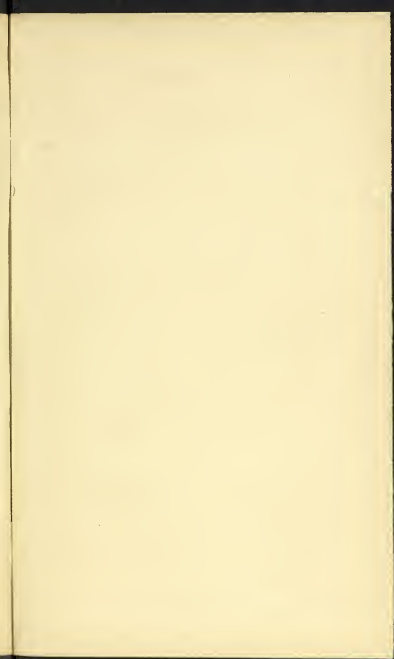
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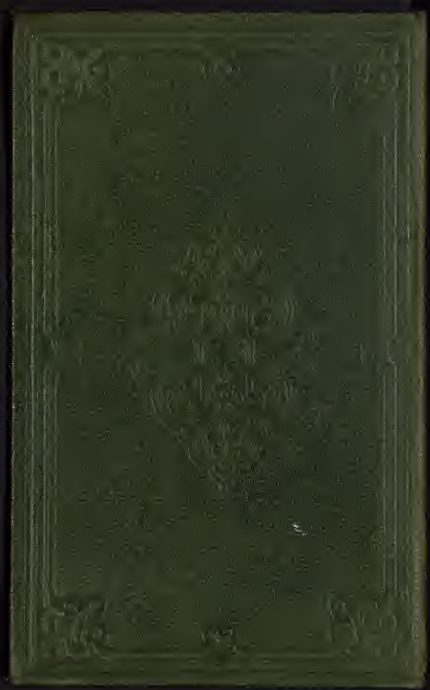


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